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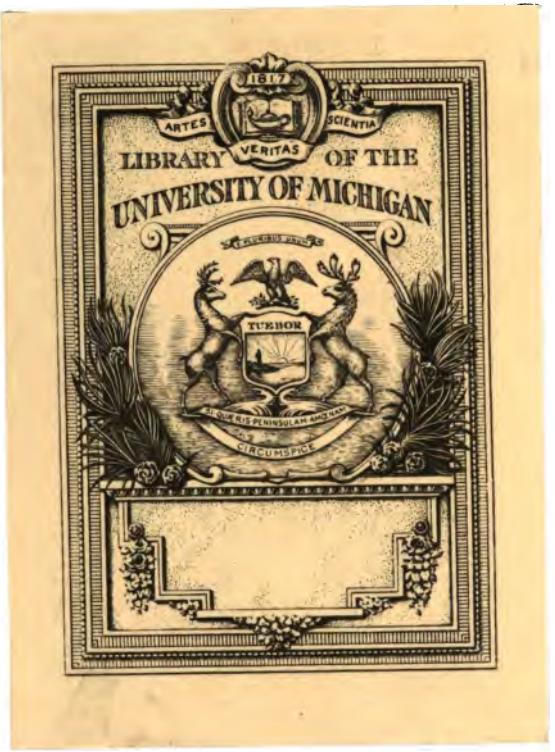
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# SYNOPSIS

OF THE

# GENUS FOMES

*By*
C. G. LLOYD.

CINCINNATI, OHIO, . JANUARY, 1915.

REV. H. BOURDOT

who is in Europe to-day the leading authority on resupinate fungi, and has written the best and only exhaustive systematic account of those occurring in France. I am indebted to him for the determination of my Swedish resupinate specimens, and I beg to dedicate this pamphlet in appreciation of the many kindnesses received from him.—C. G. L.

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# THE GENUS FOMES.

As defined in Saccardo, the genus Fomes embraces the pileate species with pores, which are perennial, forming successive strata of pores each year. In this sense it is a very easily-recognized and natural collection of plants. We would restrict it to this definition. Fomes are easily known, being mostly hard, woody species that persist for years on trunks of trees. A few of the perennial, hard species (Trametes pini and Trametes odorata as usually known) were not included in Fomes because the pores were not supposed to be in strata. This is a mistake for the pores are in as distinct strata as any species of Fomes. We have included them as Fomes species in the addendum.

There is another section of polyporoids that might be sought in Fomes, but which is not included. These are the perennial, resupinate species with strata of pores. As these also would be included in Poria, taking the simplest definition of this genus, viz., "resupinate Polyporus," we think it better to so classify them. A plant that is usually a Poria will rarely form a pileus. We know two such in Sweden, but we include them in Poria, as we feel that species should be classified according to their usual form.

In temperate regions there is usually no trouble whatever in distinguishing a Fomes from a Polyporus, the Fomes being the hard, subwoody, perennial species, the Polyporus the soft, fleshy, annual species, but in the tropics some species of Polyporus, as Polyporus gilvus, sometimes take perennial forms. Also there are species of Polyporus in the temperate regions, as Polyporus dryadeus, which when old become hardened and indurated, but that does not make them Fomes.

Although Fomes is usually such a simple and easily-recognized genus, there are in our "literature" perhaps more species that are wrongly classed as Fomes than of any other genus. This is due to careless work on the part of those who first arranged the species, and largely to Cooke, who made the first general compilation, which was followed by Saccardo. I doubt if a single one of the first sixty-one species found in Saccardo belongs in the genus according to the definition that Saccardo gives, but this was fully considered in our pamphlet on the Stipitate species.

Fomes are mostly sessile plants, for naturally plants that persist for several years must have a firm attachment to the host. Some species, such as Fomes applanatus, normally sessile, may develop stipe-like bases growing under unusual conditions. A few species (cfr. Section 75) in the tropics have a natural tendency to form a stipe. The tissue or context, as it is called, of most Fomes is hard and subwoody, a few species, such as Fomes Laricis, Fomes perlevis, Fomes floccosus have soft, friable or spongy tissue. Where measurements are given in this pamphlet as the size of a species, it is of course our intention to convey only a general idea.

In shape, Fomes are divided into those with ungulate or hoof shapes, and applanate or relatively thin shapes. The general shape is usually characteristic of the species. Thus, Fomes applanatus, as its name implies, is generally flat and relatively thin, but sometimes ungulate specimens occur. I think the position of growth in relation to the host has something to do with it. Thus in France, where I noted Fomes fomentarius growing abundantly on the standing beech trees, the shape was ungulate, but when it developed on a fallen trunk I found it more thin and applanate. As a usual thing, Fomes grow on standing trees, and hence are usually ungulate.

The general color of the context is the most constant feature of the species of Fomes, and has been used as a basis for grouping the species in most works. The color may vary a few shades in the same species, but usually the context color is the best single character that a species has. In designating the color, we have

matched it in Ridgway's Standard and used his terms. Wherever a definite color term is used in this work, as "Sudan Brown," the term is taken from Ridgway. Due allowance, however, must be made for slight difference in color of specimens, which may vary through two or three shades of Ridgway, and particularly for my personal error, for I am not expert at matching colors. The use of definite color terms will be nearer the truth, even if not strictly accurate, than the prevailing custom of employing such terms as "brown," "ferrugineous," etc. The larger part of the species of Fomes have context color of some shade of brown. For convenience, we have endeavored to arrange them into light brown and dark brown subsections, but too much dependence must not be placed on it, for I doubt if the line of division is definite enough to be practical.

The use of the microscope in the determinations of species and relations of species to each other is a recent introduction. The older mycologists judged species only on their general resemblance, and they were often badly mistaken. The microscope shows some marked and constant characters, as the color and shape of the spores, the presence or absence of setæ on the hymenium, and in a few instances special structural characters, as the large, colored, bristle-like hyphæ imbedded in the tissue of Fomes pachyphlœus (see page 261, figure 600).

The spores are mostly hyaline, but many species, usually with brown tissue, have colored spores, and those of the section Ganodermus have the peculiar, truncate spores of this section. Species with colored spores nearly always retain their spores in abundance in the dried specimen. It is often difficult to find spores in dried specimens of species with hyaline spores, and errors are liable to be made in examining them. The spore records of this pamphlet are as I have found them, excepting in a few instances. The size of the spores as recorded is not intended as absolute, for spores vary in size on the same slide. I usually pick out a spore that I think is perfect and of the largest size and measure it.

This pamphlet was written at Kew, and when I was unable to find spores, Miss Wakefield, who is more expert with the microscope than I, kindly hunted for them and sometimes found them, and such are recorded on her observations and marked (W.). In a few cases, marked (B.), the measurements are taken from Bresadola's record.

The presence or absence of colored setæ on the hymenium is a strong, though I think not invariable, character of species, but, like all classes of fungi, it is restricted to those with brown context. As a usual thing setæ are easily found in those species that have setæ, but cases have been observed that throw doubt on its being an invariable character. There are a few species, such as Fomes connatus, that have large hyaline "cystidia" on the hymenium.

Basidia are rarely if ever found in the dried specimen, but some species have a sub-hymenial layer that persists and may be mistaken for spores. This latter is shown in figure 600, page 261. In many species, however, no indication of this structure can be found. The spores as found in Fomes specimens are supposed to be basidial spores, and in most cases no doubt are. Conidial spores, or spores borne direct on the hyphæ, are known in some species, and I suspect occur more frequently than supposed, for it is difficult for me to believe that the masses of spores found lining the tubes of some colored spore species are of basidial origin.

The Fomes of Europe and the United States are well known, and probably all species have been named. Also I feel sure, from the elaborate collections in the New York Botanical Gardens from tropical America, very few additional will ever be found from this region. The remainder of the world, particularly Australia, Africa, Japan is but scantily represented in the museums, and many will yet be added from these little-worked regions. Still I think all the common species of the world are named.

In preparing this pamphlet I have worked over the specimens in the principal museums of Europe and this country, including the fine collection in the New York Botanical Gardens, where is preserved the best collection of tropical American material in existence. In our own museum we have as many specimens in numbers, if not in variety, as are found in the other museums we have visited. Where specimens are cited, we refer to those in our museum. We extend our thanks to those who have aided us with specimens, and for the courtesies we have received in the various museums. This pamphlet was written at Kew, where the most of the historical specimens are preserved.

To Rev. Bresadola I am indebted for his determinations and opinions of a number of doubtful specimens, and to Miss E. M. Wakefield, at Kew, for the sketches that are used, as well as for various other helps in this work.

## DIVISIONS OF THE GENUS FOMES.

We have divided the species into seven general divisions and sections as follows:

1st General Division, Pallidus. Context and pores pale, white, isabelline or pale yellowish, pale rose or cinnamon. Spores hyaline.


Section 55. Large. Context white, soft, friable..... p. 213.
" 56. Large. Context white, hard..... p. 214.
" 57. Small. Context white or isabelline..... p. 218.
" 58. Context pale yellow..... p. 219.
" 59. Context color isabelline. Context hard..... p. 220.
" 60. Context isabelline. Soft, punky..... p. 220.
" 61. Context pinkish cinnamon..... p. 220.
" 62. Context cinnamon..... p. 223.
" 63. Context pink or rose color..... p. 223.


2d General Division, Depallens. (As this section.)


Section 64. Pores darker than the context, usually fading out in old specimens..... p. 228.


3d General Division, Aurantiacus. Context orange rufous.


Section 65. Spores hyaline (or very pale colored)..... p. 231.
" 66. Spores colored..... p. 232.


4th General Division, Bicoloris. (As this section.)


Section 67. Section with bicolored tissue, the pores a dark brown, the flesh a light buff..... p. 232.


5th General Division, Funalis. (As this section.)


Section 68. Pileus with a thick pad of dense, brown hairs, analagous to section Funalis in Polystictus..... p. 233.


6th General Division, Fuscus. Context some shade of brown. Spores not truncate.


Section 69. Setæ, none. Spores hyaline..... p. 234.
" 70. Setæ present. Spores hyaline..... p. 241.
" 71. Setæ, none. Spores colored..... p. 248.
" 72. Setæ present. Spores colored..... p. 257.


7th General Division, Ganodermus. Context brown. Spores truncate.


Section 73. Fomes-Ganodermus. Pores with thin walls. p. 263.
" 74. Ponderosus-Fomes-Ganodermus. Pores with thick walls..... p. 269.
" 75. Stipitate Fomes of the Section Ganodermus.. p. 270.


# FIRST GENERAL DIVISION—PALLIDUS.

Context and pores pale, white, isabelline or pale yellowish, pale rose or cinnamon. Spores hyaline.

### SECTION 55. LARGE. CONTEXT WHITE, SOFT, FRIABLE.

FOMES LARICIS.—Pileus ungulate, when young with a thin, smooth crust, which soon becomes broken up into a rough surface. Flesh white, soft, friable, bitter to the taste. Pores minute, white with yellowish mouths. Spores (W.) 2½x4, elliptical, hyaline, apiculate, guttulate.

This differs from all other European species of Fomes in its soft flesh, hence is still found in Saccardo as a Polyporus. Notwithstanding its soft context, it is a typical Fomes, permanent, of slow growth, and with many annual pore layers, which, however, become indistinct. The plant occurs in Europe only on the Larch and only known from the Alpine regions. For years it has been employed in medicine as a laxative, and the crude drug is mostly exported from Trieste. In the United States it occurs on other acerose trees, and is rather rare. It is only reported from the North and Northwest, but I have a collection from the Northeast.

ILLUSTRATIONS.—Bulliard, 296, good; Jacquin, Vol. 1 t. 21, crude; other figures are largely in medical works.

SPECIMENS.—P. Hariot, from the Alps; Paul Dumée, Switzerland; L. W. Riddle, Massachusetts; C. V. Piper, Washington; Jas. L. Weir, Idaho.

Compare albogriseus, Aegerita, officinalis, purgans.

**Fig. 570.**
Fomes hornodermus

**SECTION 56.** LARGE. CONTEXT WHITE, HARD.

FOMES HORNODERMUS (Fig. 570).—Pileus mostly applanate, 1½x2 inches thick, rarely ungulate, with a very hard, black, smooth, usually sulcate crust. Context and pore tissue white when freshly cut, but on exposure to air turn fuliginous in spots, very hard, ligneous. Pores minute, hard, in layers.

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This species is hard and heavy and the tissue is very finely grained. It is tropical, frequent in West Indies and other American tropics. Also occurs in Africa, Java, and the Philippines, though the eastern form differs slightly from the American form. The eastern form has more minute pores and harder context. Also, it takes ungulate forms. I have a specimen from New Zealand over a foot in diameter, and with more than 25 annual layers. At Kew is a large, ungulate specimen from Madagascar, with about fifty annual pore layers. I have a Madagascar collection with paler crust than usual.

SPECIMENS.—New Zealand, W. A. Scarfe (very large), R. S. Robinson (?); Mauritius, C. A. O'Connor; Madagascar, Henri Perrier de la Bathie; Brazil, Rev. Rick.

Compare hippopus, ligneus, sulcatus.

FOMES MARTIUS.—Pileus applanate, thin, 1-1½ cm. thick, with a hard, smooth, reddish brown or black crust. Context white, slightly punky, often tinged with orange shade directly under the crust. Pores very minute, hard, slightly isabelline.

This species is similar to Fomes hornodermus, but thinner, and context not so hard. The crust also varies from shades of reddish brown to black, and is often zonate. It was originally from Brazil, but there are a number of collections at New York (called Fomes subferreus in part) from Central America and West Indies. I have a collection from Australia.

SPECIMENS.—W. W. Froggatt, Australia.

FOMES OBESUS.—Pileus globose-ungulate, with mat surface, and thin, indistinct crust. Context and pores white, soft, ligneous, with many narrow pore layers 2 mm. wide.

This is based on a single specimen from Pacific Islands (Apataki) on a cocoanut tree. Type at Paris. I do not know if the narrow zones represent pore layers or zones of the context.

FOMES ROSEIPORUS.—Pileus applanate, with a thin, smooth, brown crust. Context white, with a faint pinkish tint. Pores minute, pale rose.

This was named from Java. The type is not at Paris museum. The above description is from a specimen at Kew recently collected in Java by v. Hoehnel.

FOMES SUBRESINOSUS (Fig. 571).—Pileus applanate, with a black, smooth, shiny crust. Context white, contrasting strongly with the black crust. Pores minute, slightly darker than the context. Spores globose, 4 mic. hyaline.

This is a frequent species in the East, Africa, Ceylon, India, Philippines, etc., and has been known for years. I found it named Fomes nigro-laccatus in the museums at Berlin and Paris, which was an error said to be based on determinations of Cooke. The records of nigro-laccatus, Patouillard p. 103, and Bresadola, Kamerunenses, p.

**Fig. 571.**
Fomes subresinosus

42, are based on this plant. At any rate, Murrill named it as above, and if he knew anything of its previous European history, he did not mention it. It is badly named, for it is not at all resinous.

SPECIMENS.—Some foreign country, M. Dumée; Tonkin, Mus. Paris; Ceylon, T. Petch.

FOMES CONNATUS.—Pileus usually imbricate, dimidiate, the surface white (or blackish with age), without a distinct crust. Context hard, ligneous, white. Pore layers ⅔ mm. long, very distinct, with a narrow layer of paler context between each annual layer. (See Fig. 572.) The color of pores is ochraceous, decidedly darker than the context. Pores minute, round. Spores globose, hyaline, smooth, guttulate, 5-6 mic. Hymenium with large capitate, hyaline cystidia.

Fomes connatus is a common species, both in Europe and America, and no doubt in other temperate countries. There should be no trouble in determining it, as it is the only Fomes with pale context that ever has the pore layers separated so distinctly. It grows on various frondose woods, preferably on maple, and I have usually collected it near the base of maple trees. Often it is covered with moss, as shown in Fries' Icones, and Boudiers' excellent figure. The tendency of recent writers is to call it Fomes populinus, but the name is not only uncertain, but, judging from the picture on which it is based (Fl. Dan. 1791), probably not true. Subresupinate forms of Fomes connatus have been misdetermined as being Poria obducens, and Poria obducens has been referred as a synonym on this basis. I think

the true Poria obducens is not a form of Fomes connatus. The cystidia with encrusted heads, about 10 mic. thick, are abundant over the hymenium.

ILLUSTRATIONS.—Three excellent illustrations have been given of it, Boudier, t. 1, Fries Icon. t. 185, and Gillet t. 465.

SPECIMENS.—Europe, many; United States, many; Japan, A. Yasuda.
Compare Meliae, oxyporus, populinus, Secretani.

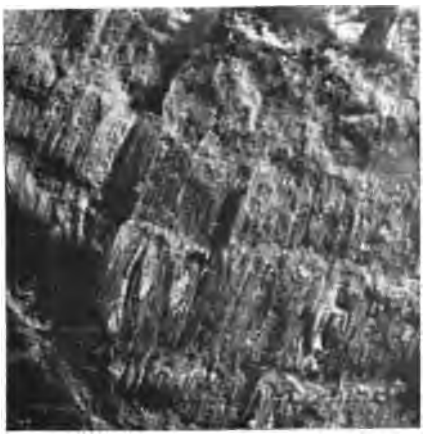

**Fig. 572.**
Pore strata of Fomes connatus X 6.

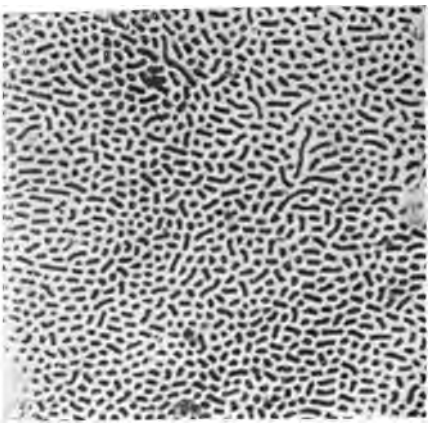

**Fig. 573.**
Pore mouths of Fomes annosus X 6.

FOMES ANNOSUS.—Pileus woody, usually thin, uneven, irregular, with smooth, brown crust. Context white or pale yellowish, drying yellowish, hard. Pores small, round, or elongated with thin walls. The annual pore layers form irregularly and separately over those of the previous year, and the tubes are not continuous, as in most other species of Fomes. Spores globose, hyaline, smooth, 4-5 mic.

This is a common species both in Europe and the United States. Usually on acerose wood. It rarely develops a perfect, regular pileus. Often it is subresupinate, forming irregular masses about the roots of acerose trees. I have rare collections from frondose wood.

ILLUSTRATIONS.—Brefeld, No. 8, t. 9 is so perfect it is not worth while citing others. This is miscited by Saccardo as being Fomas roburneus.

Compare irregularis, Gillotti, castaneus, contrarius, cryptarum, hypopolius, marginatus.

FOMES CUNEATUS.—Pileus narrow, ungulate, or wedge-shape, with rugulose, ridged, brown surface, hardly a distinct crust. Context white with a yellowish tinge, hard. Pores minute, white, with white mouths. Spores (?) globose, 3½ mic., hyaline.

Based on a collection from New Zealand at Kew, collected by Rev. W. Colenso, on Fagus Solanderi. It is quite close to Fomes

annosus in context color and surface color, but differs in its peculiar shape, and pore development. The pores of the species form continuous layers, as is usual in Fomes, not separate and independent layers, as in Fomes annosus. The type specimens are two to three inches wide, but the collector states that it "grows very large."

**SECTION 57.** SMALL. CONTEXT WHITE OR ISABELLINE.

We include in this section Fomes ohiensis, which really forms a section of itself. It has large, obovoid, truncate, hyaline spores, similar (except color) to the spores that characterize the section Ganodermus. No other known Fomes has similar spores, but Polyporus ochroleucus does have such spores, and in a natural arrangement should be classed in same section with Fomes ohiensis.

FOMES OHIENSIS.—Pileus small, dimidiate, usually less than 2 cm. in diameter, ½ cm. thick, white, hard. Surface smooth, even, with no distinct crust. Context and pores white. Pores small, round, regular. Spores obovate, truncate at base, hyaline, smooth, 8x12-14.

This is quite a frequent little species in Ohio, growing around Cincinnati, usually on rail fences, rarely on logs in the woods. At New York there is a collection from Cuba, and Romell records it from Brazil. But one collection is so referred from Europe, sent to me from Portugal by Rev. Torrend, but I can not be sure it is not a small specimen of Polyporus ochroleucus. It is unknown from the East, being replaced there by Polyporus ochroleucus.

SPECIMENS.—A dozen from Ohio, mostly my own collections, one collection from Dakota, Dr. J. F. Brenckle, but not elsewhere have I gotten this typical form.

Large form.—There occurs in New York State a larger form than the usual Ohio form. I have a specimen 1x1x1½ inches. I have only seen one collection of it from the west.

SPECIMENS.—New York, L. H. Weld, D. Reddick; Ohio, Burt Leeper.

FOMES SCUTELLATUS.—Pileus ligneous, usually scutellate from position of growth on underside of branches, rarely dimidiate, small, usually about a cm. in diameter. Surface rugulose, dark brown or black. Context isabelline. Pores minute, the tissue isabelline, but mouths, when fresh, white. Spores not found by me.

This little species is American only, as far as known. It grows usually on under side of alder, hazel, and other soft wood branches, lying on the ground in moist places. It is common in the swamps of our northern and eastern States. I do not find spores even in freshly-collected material. Fomes scutellatus is well named, for in every collection I have, excepting one, all specimens are scutellate. It is rarely dimidiate. Morgan confused Fomes ohiensis under the name Fomes scutellatus.

SPECIMENS.—Eight collections all from the north, Canada, Michigan, or the east, New York, Vermont, etc.

FOMES ATRO-ALBUS (Fig. 574).—Pileus small, about a cm. in diameter, thin, applanate. Surface with a thin, black, zonate crust. Context and pores white, contrasting with the black surface. Pores minute, round. Spores (B) 2½x3x6-7 mic.

Fig. 574

This little species was well named from Java, and is only known from this country. I have not noted strata of pores and am not sure it is a Fomes. There are specimens at Berlin and Kew.

**SECTION 58.** CONTEXT PALE YELLOW.

FOMES PINICOLA.—Pileus applanate or ungulate. Surface with a thin, resinous crust, at first white, soon reddish, finally black. Context pale yellow, punky, but hard. Pores minute, round. Pore layers about a cm. thick, pale yellow, harder than the context. Spores 3½-4 x 7-10, obovate, hyaline, smooth.

This is a most abundant species in all pine regions. It usually grows on acerose wood, pine, hemlock, but is not rarely found also on birch and other frondose wood in pine regions. Very common in the United States and Europe, and occurs no doubt through the temperate world. We have seen specimens from Japan, Mexico, India, Philippines, and (?) from New Zealand. There is no uniformity in regard to the name, and in several museums it is found in three covers—Fomes marginatus, Fomes ungulatus, and Fomes pinicola. Both Persoon and Fries thought that the frondose wood from which they called marginatus was distinct from the pine woods form.

Dr. Harper and Prof. Peck both think that two different forms (or species) occur. One an applanate, thin form with broad, annual layers, softer tissue and short lived, the other ungulate, with many narrow, annual layers and long lived. I am inclined to view the difference as one of nutrition. On some hosts (hemlock) where the wood is softer and retains the moisture, the fungus makes a more rapid growth, and more quickly extracts its supply of food, hence grows faster and does not live so long.

ILLUSTRATIONS.—Schaeffer, t. 270 earliest and best. Gillet, t. 464 fine. Others are mostly indifferent.

SPECIMENS.—Europe, many; United States, many; Japan, J. Umemura, A. Yasuda; Philippines, E. D. Merrill, (4 cols.); Mexico, Dr. M. M. Solorzano.

Compare Alni, fulvus, helveolus, marginatus, ponderosus, ungulatus.

FOMES SUBUNGULATUS.—Described from the Philippines, is similar to Fomes pinicola, and has been confused with pinicola. The context is isabelline (rather than yellow) and softer. It has same crust, pores, and I think is an extreme form of Fomes pinicola.

FOMES LATISSIMUS.—Pileus applanate. Surface with a thick, rough, hard, black crust. Context hard, isabelline yellow. Pores very minute, hard, more yellow than the context, indistinctly stratose. Cystidia hyaline. Spores (B) 3½–5 x 6-8. This is known to me only from cotype specimen from Java. Murrill's reference to Fomes ligneus from Philippines is said to be same thing.

FOMES RUFO-FLAVUS.—Pileus small, dimidiate, thin, with a dark, reddish, thin crust. Context pale yellow. Pores in layers (cfr. Myc. Notes, p. 458) in old plants. Pore mouths bright yellow. Cystidia large, rough, hyaline, cylindrical, 8 x 40 mic. Spores (conidial) small, 1½ x 2½ mic.

This little plant appears to be rare in tropical America, and but few and scanty collections have reached Europe. It was named from a Cuba collection. By some means it has become established in hot houses and mines in Europe, and several collections have been distributed (Rabenhorst 2005, Sydow 16) under the name Polyporus Braunii. Most of the specimens found in the museums are this introduced plant. Ordinarily it would not be referred to Fomes, as the usual collection is an annual. I am convinced on comparing (both to eye and microscope) that the introduced European specimens are the same species as originally from Cuba.

Compare Brownii, canaliculatus, Engelii, paradoxus.

Fomes hemitephrus cfr. next subsection.

**SECTION 59.** CONTEXT COLOR ISABELLINE. CONTEXT HARD.

FOMES HEMITEPHRUS.—Pileus ungulate, with dull surface, becoming dark in old specimens, but indistinct crust. Context hard, woody, yellowish isabelline color. Pores minute, hard, with concolorous tissue.

This species, known only from New Zealand and Australia, is abundantly represented at Kew. Specimens are recorded on Fagus.

SPECIMEN.—New Zealand, P. S. Robinson.

(Cfr. Fomes concavus in section 61.)

**SECTION 60.** CONTEXT ISABELLINE. SOFT, PUNKY.

FOMES FLOCCOSUS.—Pileus ungulate, with a dull brownish surface, indistinct crust. Context very soft, light, punky, isabelline. Pores harder than the context, concolorous, small, round. Spores 6-7 x 12-14, narrow, elliptical, smooth, guttulate.

The type was from Africa, having been misreferred to Fomes introstuppeus by Hennings. I have a collection from Ceylon, and I believe it to be the same as Polyporus levissimus, which Fries described from Ceylon, and which answers exactly. Excepting as to spores, it reminds me much of the specimens supposed to be young Fomes fraxineus found in our country. It was described as Trametes.

SPECIMENS.—Ceylon, T. Petch.

Compare levissimus.

**SECTION 61.** CONTEXT PINKISH CINNAMON.

There are four tropical species with context exactly same color on comparison, which matches "pinkish-cinnamon" of Ridgway's scale. The first three seem to me to be same plant, excepting pore sizes.

FOMES SEMITOSTUS.—Pileus thin, applanate, rigid, with hard reddish brown, sulcate, smooth surface, indistinct crust. Con-

text scanty and pore layers pinkish cinnamon. Pores very minute, in narrow (1-1½ mm.) layers.

This is known from the type at Kew, from India. Also a specimen from Fries (Tahiti) sent Kew and labeled (in error) Fomes Kamphöveneri. The illustration, under the name Fomes semitostus, in Petch's work is a misdetermination (cfr. Fomes lignosus). Trametes plebia (which Murrill called Fomes luzonensis) has the same context and pores, but not the same surface, and for me is a Trametes with non-stratose pores. It has been referred to Fomes semitostus as a synonym.

Compare LeRati, tasmanicus, Kamphöveneri.

FOMES NONTOSTUS, with the same context color, pores, and texture. This has well-developed context and the surface is pale, sulcate. It is perhaps a form of Fomes semitostus, but the name has no application to it.

SPECIMENS.—Henri Perrier de la Bathie, Madagascar.

FOMES SCLEROMYCES.—Pileus thin, applanate, with reddish brown surface, blackish with age. Context pinkish cinnamon. Pores small, round.

Known from type (Cuba) at Kew and very similar to preceding, but with distinctly larger pores. It is omitted in N. A. F.

FOMES RUBRITINCTUS.—Pileus thick, applanate, with smooth, brown surface, blackening with age. Context when young pinkish cinnamon; when old, sayal brown. Pores large, round, somewhat irregular. Pore layers separated by thick layers of context in a similar manner to that found in Fomes connatus.

This is based on one collection in Ellis' herbarium, made by Smith in Nicaragua. It was named Fomes laminatus by Ellis and so distributed, Smith No. 138. Afterwards Murrill renamed it as above.

Compare laminatus.

FOMES DOCHMIUS (Fig. 575).—Pileus thin, applanate, with thin edge. Surface with a black, rimose crust. Context pinkish cinnamon. Pores very minute, hard, concolorous, with soft, pubescent mouths.

This seems to be quite a frequent species in the East and West Indies, but most of the specimens at Kew are from Ceylon. It has been confused with Fomes ferreus by Berkeley and others. A single specimen (Wright 248) from Cuba, is at Kew. It was published from Cuba by Berkeley as Fomes ferreus, and is the same plant that Murrill calls Fomes subferreus in part. The recent Vienna exsiccatae 1908, under the latter name, is Fomes dochmius.

SPECIMENS.—Ceylon, T. Petch.

Compare subferreus.

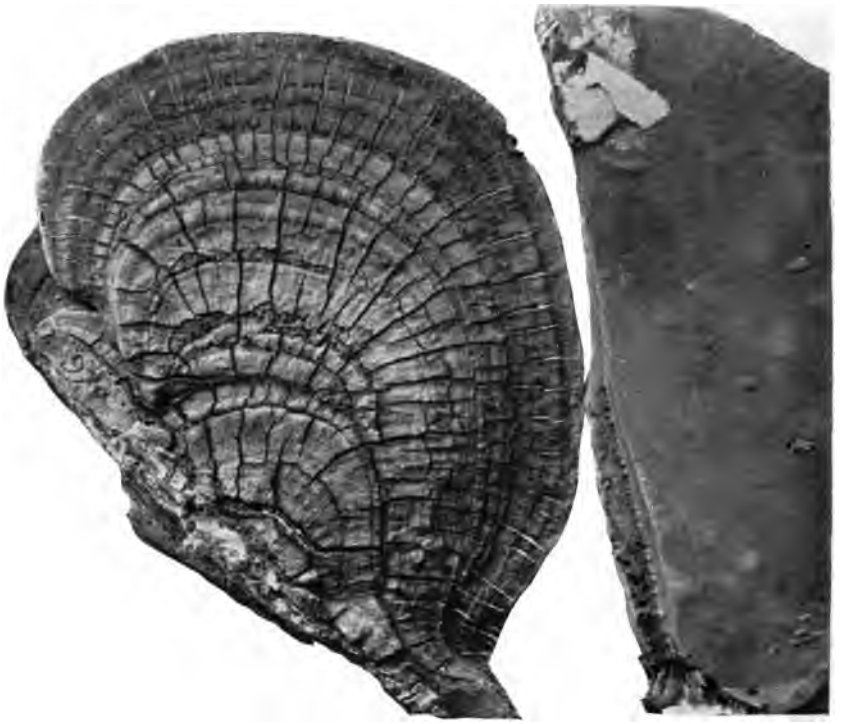

Fig. 576.
Fomes dochmius.

FOMES CONCAVUS.—This is very much the same as Fomes dochmius, same shape, similar context color, pores, but the type has a thick, black crust, showing no disposition to become rimose, and the context has no pinkish tint, but is of an isabelline color. It is known only from type from Australia at Kew.

FOMES ABRUPTUS.—Pileus dimidiate, thin, with acute margin. Surface hard, but no distinct crust, minutely pubescent (under a glass), pale, vinaceous, reddish when dry. Context hard, pale pinkish. Pores minute, with concolorous mouths, and rarely indistinct layers.

Berkeley named this from Aru Island, or at least something that looks something like it. I am not sure it is the same thing, though. I gathered it in Samoa, and as I remember, when fresh it had a pale pinkish surface, and I judge the specimens are much darker color now. I was under the impression that it was a Polyporus, but when I came to describe it I noted distinct layers of pores. The surface color is peculiar. I hardly know where to match it in Ridgway. The minutely pubescent surface has a smooth appearance to the eye, but a low power readily shows the minute hairs. The plant is closely re-

lated to Trametes plebia. Notwithstanding the pore layers of our specimen, I think the plant is a better Polyporus than Fomes.

SPECIMENS.—Australia, W. W. Froggatt; Samoa, C. G. Lloyd.

### SECTION 62. CONTEXT CINNAMON.

FOMES FERREUS.—Pileus thin, applanate, with smooth brown or finally black crust, margin often paler color. Context cinnamon, somewhat punky. Pores quite minute, the pore mouths pale, bruising darker.

This species was named from a young species from Ceylon, and seems frequent in Australia and the East. I have collected it in Samoa. The young surface is at first white, becoming black when old, but the usual specimen is generally variegated in color. The context of the type is a shade darker than the fresh material. Fomes ferreus does not occur, I believe, in American tropics. The determination from Cuba should have been referred to Fomes dochmius.

SPECIMENS.—Samoa, C. G. Lloyd.

Compare nubilus.

FOMES FRAXINOPHILUS.—Pileus irregular, unguliform, with hard, rough surface. Context cinnamon, hard, woody. Pores pale, small. Spores 6 x 8 mic., hyaline, smooth.

This species is only known from America. It is not rare in United States, and is found on two hosts, the ash, and in the West on Shepherdia. The latter has been called Fomes Ellisianus, but excepting as to host is the same as Fomes fraxinophilus. Growing on the small stem of Shepherdia, it often nearly surrounds the stem, and differs usually in form from the same plant as it grows on the large trunks of the ash. The context, pores, spores, and every essential character are the same.

SPECIMENS.—On ash, a number from Dakota in the West to New York in the East. On Shepherdia from Montana, Dakota, and Nevada. We have one collection on oak from Dr. J. F. Brenckle, North Dakota.

Compare circumstans, Ellisianus.

### SECTION 63. CONTEXT PINK OR ROSE COLOR.

FOMES ROSEUS (Fig. 576).—Pileus ungulate, at first with a reddish crust, in old specimens black and sulcate. Context Corinthian pink to buff pink, hard. Pores concolorous, minute, in distinct layers. Spores oblong, 4 x 10, hyaline, smooth.

This is a rare species both in America and Europe, and I have never seen the typical European form from the United States, but connecting forms. It has been confused with Trametes carnea, a very frequent plant in America. Bresadola gave them as synonyms, which was copied by Murrill, hence the account of "Fomes roseus" in N. A. F. does not refer to this plant. I protested to Bresadola, and

he has since corrected it in a measure, but Murrill has probably never learned the difference.

Fomes roseus grows on coniferous wood. It is rare and few specimens are in the museums.

ILLUSTRATIONS.—Fries Icones, t. 186 as rufo-pallidus. Drawn from young specimen. I am satisfied that Fries Icones t. 184, fig. 1, represents old Fomes roseus. It is labeled Polyporus roburneus, but has little resemblance to the type at Kew, and it does well represent old Fomes roseus.

Compare Alni, fulvus, rufo-pallidus.

**Fig. 576.**
Fomes roseus.

**Fig. 577.**
Trametes carnea.

**TRAMETES,** WITH PINK OR ROSE COLOR.

There is a group of plants with flesh or rose colored context that is usually classed either as Polyporus, Polystictus, or Fomes. I think it is better classed as Trametes, but will not discuss here the troublesome question as to how Trametes differs from the other genera. We shall consider here the species of this group only.

TRAMETES CARNEA (Fig. 577).—Pileus thin, rarely a half cm. thick, usually long and narrow, often largely resupinate. Surface (in the Eastern form) even, slightly rugulose, varying reddish, pale or dark in same collection. Context fibrillose, corky, salmon rose. Pores concolorous with concolorous mouths, minute, round, 2-3 mm. long.

This is a frequent plant in the pine regions of the United States, usually on coniferous trees. It is unknown from Europe. In all American mycology it has been called Fomes carneus, "Nees" a tradition handed down from Berkeley, and the name is so well fixed to the American plant that it is too late, in my opinion, to correct it, especially as the only way would be to call it a "new species." While this is not the original of Polyporus carneus evidently, as it does not grow in Java, no one knows what Polyporus carneus originally was (probably Polyporus rubidus, but that is a guess), there is no good reason why we should not continue to apply it in the sense it has acquired by years of use. Bresadola referred it as a synonym for Fomes roseus, and Murrill copied him, but the only resemblance it has to Fomes roseus is the context color. They are not only different plants, but had better be classed in different genera.

## CONTEXT PINK OR ROSE COLOR.

Trametes carnea is usually a good, thin Trametes. I have a few specimens thickened with an additional, indistinct pore layer, but it is never a good Fomes. In our Eastern States the surface is even and often pale, but in the West it is more fibrillose, uneven, and dark. The following is a marked variety.

SPECIMENS.—Many, extending clear across the United States. None from foreign countries.

Compare Palliser.

TRAMETES ARCTICA.—This is evidently only a form of Trametes carnea, with the surface silvery white, with appressed fibrils. It is known at Kew from two collections, British America, and in my collection there is a plant from Dr. W. H. Henderson, California. It does not occur in our Eastern States where the type form of Trametes carnea is so common. Berkeley labeled it in his herbarium Trametes arctica, also Polyporus Palliser. Cooke endeavored to publish it under the latter name, but he made such a mess of it (cfr. Note 8, Letter 32) that it is better to drop Polyporus Palliser entirely.

Compare Palliser.

**Fig. 578.**
Trametes Feei.

TRAMETES FEEI (Fig. 578).—Pileus thin, pink color, applanate (10 x 14 x ½ cm.). Surface appressed, fibrillose with a zonate effect, glaucescent. Context thin, punky. Pores minute, round.

This is a tropical, American plant, very similar to Trametes carnea as to size, shape, and color, and I am not sure it is a different species. It was named by Fries from Brazil, but no specimen is in his herbarium. There is at Paris, however, an evident cotype from the herbarium of Desmazières "recu par Mr. Fee, Brazil, 1826." The fibrillose surface, which is the only distinction between this plant and Trametes carnea, is not always in evidence, and I think the two plants merge into each other. Trametes Sagraeana, named by Montagne from Cuba, is very similar, though most of Montagne's species under this name, from Brazil, are Trametes cupreorosea. At New York are many collections from West Indies, referred to Trametes Sagraeana.

TRAMETES SAGRAEANA.—Pileus thin, rigid, attached by a reduced base. Surface smooth, even, dull, soft to the touch. Context thin, punky. Pores minute, round, firm.

The type form, as illustrated by Montagne from Cuba, has very minute pores, and differs from Trametes Feei in more punky context, and surface soft to the touch, not hard and fibrillose. The type is marked by Montagne "Cuba." In the same cover, however, is another specimen marked "865" (from Leprieur), with large, sinuate pores, which Montagne also refers to Trametes Sagraeana. For me, it is Trametes cupreo-rosea. Trametes Sagraeana seems to be rare in the West Indies, and I have noted only the type. The abundant specimens so referred by Murrill from Cuba are Trametes Feei.

TRAMETES LILACINO-GILVA.—Pileus applanate, usually thin, rose or pink color, with surface strongly rugose, fibrillose. Context concolorous, punky. Pores medium round, concolorous. Spores oblong, hyaline, smooth, 4 x 8 mic.

The Australian analogue of Trametes Feei of American tropics, and of about the same color and surface. It differs in having notably larger pores and more strongly fibrillose surface. It seems to be frequent in Australasia, but is not known to me elsewhere. The next species with even surface has same color and pores, and is a form probably. The Australian forms all have larger pores than the analogues in the American flora.

TRAMETES EUCALYPTI.—This is an Australian form, agreeing with Trametes lilacino-gilva as to color and pores, but having even pileus, corresponding to surface of Trametes carnea. It is not as frequent in Australia as lilacino-gilva, and but one collection is at Kew. There is no type but a figure by the author at Kew.

TRAMETES CUPREO-ROSEA (Fig. 579).—Pileus thin, rigid, attached by reduced base, (6 x 9 x ½ cm.). Surface striate fibrillose,

pale rosy color (buff pink). Context thin, hard. Pores medium to large, ½ mm. round, at length long, sinuate, daedaloid, ½ x 2 mm. rigid, with thin walls. Tissue concolorous.

A number of specimens are at Kew from Brazil, also a collection from Malay. I know no other from the East. At Paris, Montagne

**Fig. 579.**
Trametes cupreo-rosea.

got it also from Brazil and referred it to Sagraeana of Cuba, which has much smaller pores. I have never gotten it from Rev. Rick, who finds Trametes Feei abundantly, nor have I ever seen specimens from the West Indies.

TRAMETES ROSEOLA.—Pileus sessile, narrow behind, (8 x 10 x 1½ cm.), thinner towards the margin, firm. Surface dirty rose color, not zoned, slightly rugulose. Context punky, dry, pale salmon, (light ochraceous salmon). Pores minute, rigid, 1-2 mm. long. Spores globose, hyaline, 4-5 mic.

This is a fine species, recently named from Africa. It is quite close to Trametes plebeia as to color, but differs as to context. It proves quite common in Africa, and I have specimens from Ceylon and Japan. How it escaped a name to such a late day I am not able to state.

TRAMETES PLEBEIA.—Pileus applanate, with thin edge, hard, rigid, nearly unicolor. Context, surface, and pores pinkish cinnamon. Surface smooth, dull, minutely velutinate, soft to the touch. Context hard, rigid. Pores minute, round, with thick walls.

Why Berkeley called this "plebeia" I do not know, for it is neither "common" in appearance nor occurrence. He named it from New Zealand, but recorded it also from India. The New Zealand specimen is not preserved, but we assume it was the same as the India specimen which is in existence, especially as the "description" covers it. It is not right to charge Berkeley with not knowing his own species when one has no evidence, and can only assume it as a prob-

ability. It is better to assume that Berkeley's New Zealand specimen was the same as the Indian specimen, rather than discover it to be a "new species," as Murrill did.

Trametes plebeia appears to be rare. At Kew there is only the Indian collection, but it has been found again recently in the Philippines (Copeland, 182), and good specimens distributed. Berkeley referred habitually to Trametes plebeia var. cubensis a common plant (Polyporus supinus) of American tropics, which is not a variety and has no analogy to it.

SPECIMENS.—Philippines, E. D. Merrill.

Compare luzonensis.

Fomes roseiporus with pink pores and white context. See in subsection 55.

## 2ND GENERAL DIVISION, DEPALLENS.

### SECTION 64. PORES DARKER THAN THE CONTEXT, USUALLY PALING OUT IN OLD SPECIMENS.

The plants grouped under this head have a closer relationship than is generally supposed. A marked difference is in the color of the pores and context, not found in any other section. Spores are all globose. The bright color of the fresh pores fades in old specimens, which is also a character common to all.

FOMES ULMARIUS.—Pileus ungulate or applanate, but more often forming irregular masses, usually growing at base of the trees. Surface at first white, dark in old specimens, with no distinct crust. Context at first white, changing in old herbarium specimens to yellow. Pores, when fresh, bright orange, drying chestnut red. Spores large, globose, hyaline, smooth, with thick walls measuring 8 mic. in diameter.

Fomes ulmarius is a frequent plant in Europe, growing on the elms and probably causing the hollow trees. Mrs. Hussey gives an excellent figure and account of it. It has not been found in the United States, unless the next species is the same thing. I have it from Japan.

I am convinced that historically Fomes ulmarius should be called Fomes fraxineus, as the coloration of Bulliard's figure on which fraxineus was based represents Fomes ulmarius, not Fomes fraxineus as it is known to-day. (See remarks under Fomes fraxineus.)

ILLUSTRATIONS.—Mrs. Hussey Pl. 64 (the best); Bulliard, t. 433, f. 2 (the type figure of Fomes fraxineus, but it represents Fomes ulmarius); Berkeley's Outlines, t. 16, f. 5 (poor); Lucand, t. 200 (pores inaccurate). Sowerby, t. 88 (coloration of pores not good).

Compare incanus.

FOMES GEOTROPUS.—This is the tropical form of Fomes ulmarius, and probably the same species. It differs when fresh in the more yellowish pores, and when dry in the more rugulose surface. I think, however, it is practically the same thing. It occurs in tropical America, and is quite frequent in our Southern States, growing on various hosts, and particularly the cypress. In fact, it is supposed that

**Fig. 580.**
Fomes lignosus,
(Polyporus form).

**Fig. 581.**
Fomes lignosus.
On the roots of a rubber plant

the hollow cypress trees are caused by this fungus, in which case it causes much damage and a serious loss to the lumber trade.

Compare Auberianus, glabrescens.

FOMES LIGNOSUS (Fig. 580, Polyporus form).—Pileus applanate, usually thin, 1 to 2 cm. thick, rarely of a truly Fomes form, 4 to 6 cm. thick, with many annual layers. Surface reddish brown when fresh, smooth, even, but drying with narrow, sulcate zones. Flesh white, becoming yellowish in old specimens. Pores minute, bright orange on the growing surface, but fading out below. Spores never found by me.

This is a most common plant throughout the tropical world, and has had many names. It is a distinctive disease of the rubber tree, attacking and destroying the tap roots and causing the death of the tree. We are told that in rubber countries it is quite a pest, and is all the worse because the mycelium attacks the roots of the tree and is not found until the damage is done. We have an account and figure (reproduced Fig. 581) in Myc. Notes, page 519, and Prof. Petch gives a full account in his "Diseases of Hevea" and a colored figure under the misname Fomes semitostus.

Fomes lignosus rarely takes true Fomes form. Usually it is thin, growing imbricate, and would be sought as a Polyporus (Fig. 580). Often it is resupinate, over large extent, and these resupinate pieces contract and curl in drying. The curious feature of the pores losing the color in the older portions only, is, as far as I have noted, peculiar to this species, and by this feature I can tell the species at sight.

ILLUSTRATION.—Petch, Diseases of Hevea, frontispiece, Mycological Notes, page 519, Fig. 515. (Reproduced Fig. 581.)

Compare Auberianus, diffusus, Kamphöveneri, microporus.

NOTE.—Polyporus zonalis, a true annual, is a close relation of Fomes lignosus, and not always easy to tell from young Fomes lignosus. The coloration and surface of pileus is the same, but the pores do not fade out. Spores globose, 4-5 mic. are usually found in Polyporus zonalis, and never found in dried specimens of Fomes lignosus to my knowledge.

FOMES FRAXINEUS.—Pileus applanate, with a pale, hard, dull surface, becoming brown when old. Context at first soft, punky, white (or pale), at length hard, ligneous. Pores small, round, the tissue pale with a faint pinkish tinge. Spores (W) subglobose, 5 x 6.

This is a frequent species in Europe on ash, apple, locust, and other frondose wood. It sometimes attains a very large size. We take it in the sense that it has become established by use, although not correct historically, for Fomes fraxineus originally with its colored pores was no doubt the same as Fomes ulmarius. It is closely allied to ulmarius, and has been generally confused. Berkeley seems to have been the only one who appreciates the real difference. He called this plant Fomes cytisinus, which in justice is the correct name for it. In America Fomes fraxineus is quite rare, and I have never seen anything but the earlier punky forms, and they are doubtful.

ILLUSTRATION.—Sowerby, t. 288 (as Boletus suberosus).

Compare cytisinus, incanus.

## 3RD GENERAL DIVISION, AURANTIACUS.

Fomes with "red" context have been variously designated as latericeous or in Saccardo as ruber. I think they all have an orange shade. They match in Ridgway with orange rufous or Sanford brown. No species occurs in Europe, and but one rarely in the United States. They are mostly tropical.

### SECTION 65. CONTEXT ORANGE RUFOUS. SPORES HYALINE (OR VERY PALE COLORED).

FOMES KERMES.—Pileus thin, applanate, with a dull orange surface, but no distinct crust. Usually the plant is largely resupinate with a slightly reflexed pileus. Context bright, latericeous (I should call it), but it matches Ridgway's orange rufous. Pores minute, round, at first (apparently) white, but soon become concolorous with the context. Spores not found, but undoubtedly white.

This is the most frequent red species that occurs in the East. Quantities of it have been distributed lately from the Philippines under the absurd name Fomes albo-marginatus. It is found also at Kew as Polyporus laeticolor from Philippines, Fomes kermes (the best name) from Ceylon, Fomes pyrrhocreas from Australia, and at Berlin as Fomes ochrocroceus from Java. It does not occur in the American tropics.

Compare laeticolor, albo-marginatus, ochrocroceus, pyrrhocreas.

FOMES (?) LAETUS.—Pileus thin, apparently fleshy. Spores globose, white, smooth, 5-6 mic.

It is the same colored context and is probably the same plant as Fomes kermes. Still there is no evidence that the type is a "Fomes," and it is thinner, more fleshy, and from this one collection should be classed as Polyporus. If it is a Polyporus, however, there is nothing to indicate that it is a Merisma, as classed.

FOMES PERLEVIS.—Pileus ungulate, (type specimen 6 x 10 inches). Surface dark fawn, with no distinct crust, soft, easily indented. Context orange rufous, soft. Pores in distinct layers, medium, round, the tissue concolorous, but the mouths and hymenial layer pale or white. Spores abundant, mostly 4-4½ x 5½-6 hyaline, a few (probably the ripe ones) 6-7 x 7½.

This is remarkable in its light weight and soft texture, but notwithstanding it is a true Fomes. The context is orange red, but the pale pores and light surface give no indication of it in an uncut specimen. I have received several collections from Henri Perrier de la Bathie, Madagascar. It is unknown otherwise.

Poria fulvo-umbrinus. This, as far as known, is a resupinate Fomes from Brazil, with orange rufous context and elliptical, subhyaline or pale colored spores 4 x 7 mic. It is the only similar plant known from the American tropics. The color of context is exactly the same as that of Fomes tricolor, but why called "yellow umber" when it is orange red?

**SECTION 66.** CONTEXT ORANGE RUFOUS. SPORES COLORED.

FOMES JUNIPERINUS.—Pileus ungulate, or narrowly ungulate, with a black, rimose, rough surface. Context hard, woody, orange rufous. Pores medium 2-3 to mm., at first round, at length often elongated by tearing of the walls, at first ochraceous, the tissue of the old layers gradually assume the red color of the context. Setae, none. Spores abundant, globose, 4-5 mic., pale colored.

This is a rare plant, growing, as far as known, only on species of Juniperinus, hence well named. In the United States it has been collected scantily in Kentucky and Tennessee (cfr. Myc. Notes, p. 522), but in recent years more abundantly in the Southwest (Texas, New Mexico, and Arizona), and always on juniper. In Europe it is known from a single specimen collected in Russia on juniper seventy years ago, and preserved at Paris. I am told it has also been collected in Africa, and a recent specimen sent to Kew.

SPECIMENS.—I have a fine specimen from Arizona. W. H. Long.

Compare Demidoffi, Earlei.

FOMES TRICOLOR.—Pileus large, applanate, with black, rimose crust. Context latericeous red, hard, woody. Pores minute, concolorous, paler when young, hard, woody. Pore mouths brownish. Setae, none. Spores colored, 5-5½ x 6-6½, smooth, abundant.

This species is known from a few collections in Philippines. There is a cotype at Kew. It seems to be badly named. The spores were described as "hyaline with brown walls" (sic.)

FOMES LATERITIUS.—Pileus thick, ungulate, seemingly with a thick, brown crust. Context hard, woody, latericeous red. Pores minute, concolorous, hard. Pores small, concolorous. Spores globose, 5-6 mic., colored, smooth.

While the "description" reads much like the preceding, they are quite different plants. Fomes lateritius is known from two specimens at Kew, one from Brazil, the other from Demarara.

## 4TH GENERAL DIVISION, BICOLORIS.

### SECTION 67.

This section with bicolored tissue, the pores a dark brown, the flesh a light buff, is a unique section, embracing but two known species, which are perhaps the same. The spores of one are large, globose, brown. The section is related to the section Amaurodermus in the stipitate series.

FOMES MIRABILIS.—Pileus applanate (10 x 18 x 3 cm.) with a hard, regular, brown crust. Context 1-1½ cm. thick, pale buff when dry, more yellow when moist, hard, ligneous. Pores Verona brown, contrasting with the pale context, 1½ to 2 cm. long, minute,

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hard, with yellow pore mouths. Spores globose, 7-8 mic., light brown color, smooth, punctate.

This was received from C. B. Ussher, Straits Settlement, and named in Letter No. 33. It impressed me as being very curious with its contrast of context colors and its yellow pore mouths. The pores are not stratified, and, strictly speaking, it is probably better classed as Polyporus than Fomes. The hard, woody nature is quite different, however, from any other Polyporus, and suggests only Fomes.

FOMES SCULPTURATUS.—As to its macroscopic features, it is the same as Fomes mirabilis, excepting that the pore mouths are concolorous (not yellow). The spores, however, are quite different. Large, 14 x 20 mic., ovate, brown, with a minutely punctate epispore. The epispore with brown marking is thicker near the base of the spores, and in its spores it approximates the stipitate section Amaurodermus.

We get this plant abundantly from Henri Perrier de la Bathie, Madagascar, and when we received it were impressed with the large, brown spores that ally it to Amaurodermus. There is no other plant that approximates it excepting the preceding. We thought these spores were conidial, and we believe now that Fomes sculpturatus may be a conidial form of Fomes mirabilis. It is curious, however, that among several specimens received at different times from Madagascar none have the same spores as the Malay specimen.

## 5TH GENERAL DIVISION, FUNALIS.

### SECTION 68.

Pileus with a thick pad of dense, brown hairs, analagous to section Funalis in Polystictus.

FOMES PSILA (Fig. 582).—Pileus applanate, with thin edge. surface covered with a thick pad of dense brown hairs. Context dark brown (Buckthorn brown). Pores hard, woody, very minute, with concolorous tissue and mouths, in distinct layers 4 to 5 mm. thick. Setæ, none. Spores not found, but surely hyaline.

Fig. 582.

This plant is an anomalous Fomes, and were it not for the distinct pore layers would be classed in Trametes by the side of Trametes hydnoides. The first suggestion was that it was a lapsus of Trametes hydnoides. It could be made the type of a monotypic genus. No other plant is known with stratified pores and similar pileus covering. But one specimen is known, which was sent to me from Brazil by Rev. Rick.

## 6TH GENERAL DIVISION, FUSCUS. CONTEXT SOME SHADE OF BROWN.

**SECTION 69.** CONTEXT BROWN. SETAE, NONE. SPORES HYALINE.
A.—Context light brown.

FOMES CALKINSII.—Pileus unguliform, with smooth, hard, reddish brown, at length black crust, furrowed by the overgrowing layers. Context color fulvous (ochraceous tawny) brown, hard, woody. Pores minute, with darker mouths, but the tissue is exactly concolorous with the context. Spores 5-6 x 10, hyaline, smooth (not guttulate or granular contents). Setae, none.

This is a species of Florida, growing on the oak. It was sent to Ellis by Calkins, and Ellis referred it to Fomes igniarius. I found it rare in Florida. I do not find spores in dried specimens. My record is from those thrown down from fresh specimens. Fomes Calkinsii is quite close to Fomes robustus, but has darker context color and different spores.

FOMES ROBINSONIAE.—Pileus applanate, with a rough, brown, sulcate surface. Context bright yellow (raw sienna). Pores minute, in uneven layers with concolorous tissue and dark, velutinate pore mouths. Setæ few. Spores globose, hyaline, 3-4 mic.

**Fig. 583.**
Fomes adamantinus.

This is known only from one collection, Jamaica, at New York. In its grosser characters it closely resembles Fomes rimosus. Similar context color, surface, etc., but the hyaline spores and presence of setae clearly distinguish it. It was recorded as having no setae. The plant is very close to Fomes cinchonensis, being almost the same under the microscope. The rimose surface is different, if that is a difference. This species is here by inadvertence. It belongs to next Section (70).

FOMES ADAMANTINUS (Fig. 583).—Pileus applanate, with a smooth, black crust. Context hard, rigid, color at first ochraceous tawny when old cinnamon brown. Both colors are sometimes noted in same specimen. Pores minute with concolorous tissue and mouths. Setae, none. Spores (B) 2½ x 3 x 3½-4 hyaline.

A quite rigid species of the East. The type is from India, at Kew, but there is also a collection from Japan, and it is recently recorded in the Philippines. The different color of young and old context is unusual in Fomes.

Compare glaucotus, pachydermus.

FOMES INFLEXIBILIS.—Pileus smooth, applanate, with ridged surface, or subresupinate with slightly pileate development, (both forms at Kew). Surface with hard crust-like appearance, but no distinct crust. Context very pale brown (slightly paler than Buckthorn), hard, well named inflexibilis. Pores very minute, with mouths concolorous with context. Setae, none. Spores globose, hyaline, 4 mic.

I think this is known only from types at Kew from Brazil. The recent records from Java and Jamaica are, in my opinion, both misreferences.

Compare crustosus.

FOMES EXOTEPHRUS.—In general appearance and shape, black, glabrous, rugulose crust, etc., this is quite close to Fomes caliginosus (compare on page 237). The only marked difference is in the paler color of the context, which is light brown (cinnamon) color. I do not find any spores, often so abundant in caliginosus. At Kew, Fomes exotephrus is known from a single specimen, collected by the Challenger expedition (Admiralty Island). I doubt if it is the same as the specimen labeled Fomes caliginosus, and collected on same island. Context dark brown.

In one species (under D), Fomes melanopus, the surface is dark purplish black, but the context is dark brown.

B.—Medium or large species.

FOMES FOMENTARIUS (Fig. 584).—Pileus ungulate, with a hard, smooth, grayish crust. Context punky, dark brown (Antique brown). Pores minute, with glaucous, pruinose mouths. Pore tissue paler than the context. Setae, none. Spores hyaline, large, oblong, 5 x 16 mic.

**Fig. 584.**
Fomes fomentarius.

This is a common species in many countries no doubt. In Europe it takes two forms. First, a very large, ungulate form with soft, punky context, on the beech in France. This is the only common Fomes at Fontainbleau. Second, a smaller, harder form on the birch in northern Europe. In the United States we do not have the beech form, as far as I have seen, but the form on birch is quite common in some localities.

Fomes fomentarius is often confused in the museums with Fomes igniarius and also Fomes applanatus. I have specimens of Fomes fomentarius from India and Japan. A form is also very common in the American tropics, called Fomes marmoratus.

ILLUSTRATIONS.—Many have been issued. Sowerby, t. 133 and Fries Sverig, Atlas t. 62 are both characteristic.

SPECIMENS.—United States and Europe, abundant; India, G. H. Cave, B. Sahni; Japan, A. Yasuda.

Compare introstuppeus, Inzengae, excavatus, expansus, mirus.

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Variations.—As previously stated, the "beech" form and the "birch" form are slightly different plants, but hardly entitled to separate names.

FOMES NIGRESCENS.—This form of Fomes fomentarius has a black, shiny, sulcate crust (cfr. Pol. Issue, page 16, fig. 210). This is probably the original form intended by Fries for his Fomes nigricans, but I think was confused in his latest work with the black form of Fomes igniarius. His specimens at Kew and Upsala at least are a form of Fomes igniarius. Fomes nigrescens is the plant that Klotzsch collected in Scotland and cited by Fries as Fomes nigricans. The specimen is in the exhibition case at Berlin.

FOMES MARMORATUS.—This is the most common Fomes we have in the American tropics. It is generally held to be a distinct species, but for me is the same as Fomes fomentarius in every essential. It usually differs in shape, being applanate instead of ungulate; sometimes it is quite thin. The pores are more minute. The context color is exactly the same in some specimens, in others a little lighter. The spores are hyaline, smooth, with granular contents 5-6 x 10-12 mic. as I measured them from fresh specimens recently in Florida. The crust is usually marked with black bands, but the same character in a less degree is often noted in Fomes fomentarius. I have specimens from Japan that can not be told from those of the American tropics.

Fomes marmoratus has in recent years been called by me and by others Fomes fasciatus, under an impression that a type was at the British Museum. Investigation develops that this plant has no authentic history. A cotype in Thunberg's herbarium is stated to be quite different. (Cfr. Notes 33 and 131).

Compare fasciatus, sclerodermeus, subfomentarius.

FOMES ALBO-ATER.—At Kew is a collection from Brazil (Spruce 58) which appears to be a form of Fomes marmoratus. It has a smooth, black crust, but the new marginal growth is white, contrasting strongly, and the context color is much darker brown.

Compare memorandus.

FOMES CALIGINOSUS.—Pileus thin, applanate (8-12 mm. thick), with a dark brown, or generally black, smooth, rugulose crust. Sometimes shiny, laccate. Context and pore tissue dark brown (Brussels brown). Pores minute with concolorous tissue and mouths. Setae, none. Spores usually abundant, subglobose, small, 3 mic., subhyaline.

This seems to be a frequent species in the East, Philippines, and Pacific Islands, but absent from American tropics. It is quite light in weight, and is not a typical Fomes, but rather has the appearance of being a lignescent Polyporus. The black crust is sometimes shiny, laccate, and then the first suggestion is a Ganodermus. Usually, however, it is dull.

SPECIMEN.—Ceylon, T. Petch.

Compare mortuosus, peguanus, roseo-albus, Cesatianus, Copelandi, endapalus.

FOMES SUBFLEXIBILIS.—Only known from the type at Kew, from Cuba, which is not very good and surely is not a Fomes. The context is brown, rather soft, and easily indented with the finger nail. Pores rigid, minute, concolorous, with concolorous mouths. Setae, none. Spores small, 3-3½, very pale color, almost

subhyaline. It might be recognized by comparison if ever found again. The rigid pores and rather soft flesh are the most prominent characters. The species is closely related to caliginosus.

FOMES SURINAMENSIS.—Pileus ungulate, with smooth, black, sulcate crust. Context cinnamon brown, hard, uniform. Pores very minute, with concolorous tissue and darker mouths. The layers are indistinct and hardly distinguishable. Setae, none. Spores globose, hyaline, 4 mic.

This is known from Surinam, only the types at Leiden. It could be compared to Fomes robustus, but setae are absent and context color is of a darker shade.

FOMES ROSEOCINEREUS.—Pileus very hard and heavy, applanate to unguliform. Surface with a rough, sulcate, brown crust. Context dark brown (Sudan brown). Pores very minute, hard. Setae, none. Spores globose, hyaline, 5-6 mic.

This species approaches igniarius in its context color, and spores, but is a heavier and harder species and pores are more minute. It is known only in the museum at New York, from Cuba and Central America. I think it is not well named. To my eye, there is nothing roseus and little cinereous about it.

**Fig. 585.**
Fomes scalaris.

FOMES SCALARIS (Fig. 585).—Pileus thin, applanate, with a dark, dull, fuliginous, almost black, surface, no distinct crust. Sulcate with annual ridges. Context hard, brittle, dark, fuliginous

brown (Mummy brown). Pores very minute, with concolorous tissue and mouths. Setae, none. Spores not found, doubtless white.

Known only from the type at Kew, from Brazil. The annual ridges of the pileus suggesting steps, whence the name. I have a collection from Java which has been referred here, but to me it is quite doubtful.

FOMES BACCHARIDIS.—Pileus small, applanate. Context dark brown. Setae, none. Spores abundant, hyaline, globose, 7-8 mic.

This is known to me only from some type material from Patouillard. It is a small species, comparable to Fomes conchatus, excepting in having no setae. It comes from tropical America.

FOMES TENUISSIMUS.—Pileus very thin, 3-4 mm. thick, with rugulose, zoned surface. Context dark brown. Pores minute. Setae (?) reported scanty by author, not found by me. Spores globose, hyaline, 3½ mic.

This is scantily known from Philippine collection. If it is a Fomes, as it appears to be from its woody context, it is surely the "thinnest" Fomes known.

NOTE.—Setaeless specimens of Fomes igniarius would be sought in this section.

**Fig. 586.**
Fomes angularis.

**Fig. 587.**
Fomes atro-umbrinus.

C.—Small Species, 1-3 Cm.

FOMES ANGULARIS (Fig. 586).—Pileus angular, semiresupinate, small (2-3 cm. wide, 1-1½ cm. thick). Surface black, hard, with narrow, raised zones. Context dark brown (Prout's brown). Pores minute, with narrow layers 1 mm., tissue and pore mouths concolorous. Setae, none. Spores (?) hyaline, globose, 3½-4 mic. Numerous crystals are found in making a section.

This is a small species, peculiar in its angular shape, collected by Jintaro Umemura, Nagoya, Japan, growing on Pasania. It was carelessly published as Fomes angulus. I have also some sub-resupinate specimens.

FOMES PUSILLUS.—Pileus unguliform, 1 to 1½ cm. in diameter. Surface with smooth, ridged, brown crust. Context cinnamon brown. Pores very minute. Setae, none. Spores globose, hyaline, 5-6 mic., smooth.

A little species that was collected on stems of Zelkowa acuminata by A. Yasuda, Japan. It is only known from this collection. It is quite close to Fomes atro-umbrinus of Brazil, but crust is not black and context is not so dark.

FOMES ATRO-UMBRINUS (Fig. 587).—Pileus small, unguliform, 1 to 1½ cm. Surface with an intense, black, smooth crust. Context dark brown. Setae, none. Spores not found.

This little species is hardly over a cm. in diameter. It is only known from the Spruce collection, Brazil, at Kew. The best specimens are found in the holomelanus cover.

Compare holomelanus.

D.—Plants dark purplish black. Context dark brown, with a purplish shade.

FOMES MELANOPORUS.—Pileus applanate (from 1 to 3 cm. thick), dark, almost black when old. Surface (in the type specimen from Cuba) tomentose, sulcate, but in most specimens so referred the surface is hard and smooth. Context dark purplish brown (seal brown), hard. Pores minute, the color when fresh, dark "atro-purpureus" with velutinate mouths. The tissue color of pores is darker than the context color. Setae, none. Spores hyaline, about 3 x 4 mic.

Probably a quite frequent species in most tropical countries. It is one of the heaviest, hardest species. I have noted specimens from Florida, Central America, West Indies, India, Malay, Java, Madagascar, Philippines, New Caledonia, Japan. The type specimen is distinctly tomentose, sulcate, but it either loses that feature when it becomes old, or else the usual plant is not the same as the type. Some specimens also have velutinate pore mouths; in others this is hardly noticeable. Fomes melanoporus is exceptional among the Fomes species in its dark "atro-purpureus" color, exteriorly so nearly black that Murrill's invention "Nigrofomes" would not be a bad name for it if it needed a new name. The dark coloring matter of the plant is soluble in lactic acid.

SPECIMENS.—Atrica, Henri Perrier de la Bathie; Philippines, E. D. Merrill; Japan, A. Yasuda; Nicaragua, C. L. Smith.

Compare melanoporoides, Cornu-bovis, endophaeus, phaenus.

**SECTION 70.** CONTEXT BROWN. SETAE PRESENT. SPORES HYALINE.

A.—Context Light Brown.

FOMES POMACEUS (Fig. 588).—Pileus half unguliform, but usually more inclined to take a subresupinate form with the pileus imperfectly developed. Surface at first fulvous, tomentose on the margin, later cinereous, after wintering turns dark, but not black as Fomes igniarius. Context fulvous brown (Amber brown), intermediate between the color of context of Fomes igniarius and Fomes robustus. Pores minute, round, annual layers 5-6 mm. Setae usually abundant, with thickened base, projecting 12-16 mic. Spores globose, hyaline, 5-6 mic.

**Fig. 588.**
Fomes pomaceus.

Fomes pomaceus is a frequent plant in Europe, usually on the plum trees (Prunus). In fact, in England it is a distinctive disease of the plum. It occurs in Europe also on cherry and other allied cultivated trees, but never, I believe, except on trees of the Rosaceous family. With us in the United States I only know it on wild species of Prunus. I have never noted it on cultivated plums.

Persoon had a clear idea of Fomes pomaceus, as is evident from his specimen and writings, and he seems to have been the only one who had until recent years. Fries held it as a variety of Fomes igniarius, and his description of igniarius was drawn partially from this plant. Schroeter confused it with Fomes igniarius. Berkeley always referred it to Fomes igniarius, and those who followed Berkeley in England have apparently never learned the difference. Quélet got it right. Bresadola discovered that it was Fomes fulvus of Scopoli, being one of six different men who have interpreted Scopoli's vague writings, each one with a different species. Murrill copied Bresadola. It was the basis of Fomes supinus (sic) in Morgan's work.

ILLUSTRATIONS.—If it has been illustrated, it has been under the name of igniarius or fulvus probably. I have not bothered to look them up.

SPECIMENS.—Many from Europe, mostly on plum trees. Many from the United States on wild plum. Foreign, Madeira, Carlos A. de Menezes, exactly as in Europe. Australia, Edmund Jarvis, specimen doubtful, cfr. Letter 37.

FOMES TEXANUS.—This is intermediate between Fomes igniarius and Fomes pomaceus. It occurs on Juniper in the Southwest. The black, rimose surface and general appearance of the plant is that of Fomes igniarius. The context color is intermediate, perhaps close to pomaceus. The spores of all three are the same (5-6, not 3-4, as described). Fomes texanus has yellow mycelium, agreeing with Fomes pomaceus in this respect.

FOMES CINCHONENSIS.—This, for me, is a large tropical form of Fomes pomaceus, differing, as far as I can note, in its large size, but in no essential character, context, color, spores, or setae. It also has the abundant yellowish, mycelial hyphae overrunning the old tissue, which is a frequent feature of Fomes pomaceus.

Compare Fomes Robinsoniae on page 234. Should be entered here.

**Fig. 589.**
Fomes robustus.

FOMES ROBUSTUS (Fig. 589).—Pileus ungulate, with a hard, rimose, black crust. Context light fulvous. Rhei color would be the best name for it, being the color of commercial rhubarb root. It is near to yellow ochre of Ridgway. Pores minute, with pore tissues concolorous. Spores globose, hyaline, 7-8 mic., guttulate when fresh. No setae found by me. (I am informed that setae have been noted in a Swedish specimen.)

Fomes robustus grows fairly common in Europe on the oak. It was named by Karsten (so I am told by Romell), but Karsten distributed it No. 95, labeled Polyporus igniarius. Externally, it closely resembles Fomes igniarius, but there is a marked

difference in the color of the context of the two species. If Persoon or Fries met the plant, they never noticed the difference. It is only recently that attention was drawn to the fact that the plant on oak, called Fomes igniarius by the French botanists to this day, is quite different from the plant on willow called Fomes igniarius by Fries. Mr. Romell first brought it to my notice. Hartig (in 1878) figured under the name Polyporus fulvus a Fomes on the silver fir (Abies pectinata). It has been distributed from Italy as Fomes igniarius var. Abietinus. It was afterwards called Fomes igniarius var. Pinuum and Fomes Hartigii. Notwithstanding the vastly different host, it seems the same as Fomes robustus in all characters. I think Fomes robustus is only known in Europe on oak and silver fir. In America the name does not figure in our literature, being unknown to those who have worked here on the subject. It is not known to me east of the Mississippi. A form (called Fomes Bakeri) is said to be quite common on birch in Minnesota regions. From Texas I have seen the type form of Europe on mesquite (and referred in error to Fomes texanus). I have it from California, H. S. Fawcett, on Eucalyptus.

The foreign specimens I have are from Australia, Hawaii, and Japan. A few have setae and spores a shade larger (8-9 mic.), but otherwise are exactly the same as the European form. Compare Fomes setulosus in Section 70,

ILLUSTRATIONS.—Hartig, Zersetz. d'Holzes t. 7, (as Polyporus fulvus in error). In his Diseases of Trees, this is referred to as Polyporus Hartigii).

SPECIMENS.—Many from Europe, mostly from France, on oak; also from Alpine regions, on the silver fir. I have seen none from England. From United States, only California. H. S. Fawcett, on Eucalyptus; Hawaii, C. N. Forbes; Australia, A. G. Hamilton, on Eucalyptus; Japan, A. Yasuda.

Forms.

FOMES BAKERI is a form of Fomes robustus, very close in its bright rhei context color, spores, etc. (6-7 mic. rather than 5 mic., as described), and which differs only in its surface, which is smooth, subconcolorous, without the black, rimose crust of the type. Museum specimens are only known to me from the originals in Ellis' herbarium, and in my own, from C. F. Baker, Wisconsin. I am told by Prof. Harper it is common on birch in Minnesota.

NOTE.—The plant distributed by C. F. Baker, No. 54, on Betula, Los Pinos, Colorado, and determined by Underwood as Polyporus applanatus (sic), has same general appearance and surface as Fomes Bakeri, but differs markedly in context color, and in having abundant setae. I should refer it to Fomes pomaceus, although it differs slightly.

FOMES SETULOSUS.—Pileus ungulate, with a smooth, brownish surface. Context fulvous (tawny of Ridgway), hard, woody, the pore tissue a shade lighter than the context. Pores very minute, with brown mouths. Pore layers 2-3 mm. wide. Spores globose, hyaline, 8 mic. Setae very abundant, with thick bases, and abruptly contracted and slender points, projecting 12-14 mic.

We base this name on species received from Ceylon, which are close to Fomes robustus, and when received were referred as a setae-bearing form of it. On comparing the context color, however, I find it distinctly different, the difference shown in Ridgway's tawny and yellow ochre on plate XV. In addition, it has quite peculiar and very abundant setae, found but rarely, if at all, on the European plant. There seems to be an intermediate plant in Australia closer to the European plant.

FOMES TORULOSUS.—Pileus applanate, sometimes thin, an inch or less thick; other specimens are 3-4 inches thick. Surface when

young soft, pubescent, at length with concentric raised, soft ridges, often with an obtuse, inflated edge. Context color light brown (ochraceous tawny). Pores minute, the tissue concolorous with the context, but the mouths at first purplish, losing the color when old and becoming brown. Spores hyaline, globose, 4-5 mic. Setae abundant, large, projecting 16-20 mic.

This is rather a frequent plant around Paris on the oak, and was named by Persoon, who preserved several good specimens in his herbarium. It was not included in Fries' works, hence the tradition was lost in Europe, until I unearthed Persoon's specimens (cfr. Myc. Notes, p. 470). There are, however, at Paris and Kew specimens determined by Léveillé as Fomes torulosus, and he had it right. It had been rediscovered by Boudier and Quélet, who called it Fomes fuscopurpureus and Fomes rubriporus. While it is not rare around Paris, it not known in northern Europe nor as yet found in England. In the United States but one collection has been made, viz., by C. W. Edgerton, on live oak at New Orleans. (Cfr. Pol. Series, p. 48.) I have it from Japan, and it will probably prove to be more common in the tropics when the distribution is better known.

ILLUSTRATIONS.—Boudier Icones, t. 152, fine (as Fomes fuscopurpureus).

SPECIMENS.—Many from France. Outside of France, Tirol Bresadola; Austria, v. Hohnel; and Portugal, E. Torrend. None from England. From United States, Louisiana, C. E. Edgerton, only collection known (cfr. Pol. Ser. p. 48). Foreign, Japan, A. Yasuda; Madeira, Carlos A. de Menezes.

FOMES CONCHATUS.—Pileus usually thin, conchoid, with a sulcate, brown surface. Context light brown. Pores minute, concolorous. Setae numerous, slender, with bases slightly thickened, projecting 20-28 mic. Spores hyaline, globose, 4½-5 mic.

This is a frequent species on various, frondose woods, both in Europe and the United States. The microscopic features are similar to those of Fomes pomaceus, but it can be distinguished by its general shape. It is also close to Fomes torulosus, and sometimes hard to distinguish, though Fomes torulosus has darker pore mouths and darker, thicker setae. Fomes conchatus is usually a thin plant, and not badly named.

ILLUSTRATIONS.—None published. Britzelmayr's cartoon is not worth considering, and Quélet's colored caricature has no possible resemblance to it.

SPECIMENS.—Many in Europe and United States.

Compare Langloisii.

Forms.

FOMES SALICINUS.—Growing on willow, Fomes conchatus is usually subresupinate, or with a thick, imperfect pileate development. The context color is also darker. The miscroscopic features are the same. It is a host variation and difficult to clearly distinguish. The plant is more common on willow in Europe than in the United States.

ILLUSTRATIONS.—Karsten Icon. t. 1, fig. 5, is best. Fries t. 185 is too dark. Patouillard, fig. 141, and Quélet t. 17, fig. 6, both too poor to cite.

SPECIMENS.—Many, mostly from Europe.

Compare loricatus.

FOMES DENSUS.—There occurs rarely in the United States and Europe a thick, heavy form of Fomes conchatus, differing only in not being thin. Fomes conchatus is usually about a centimeter thick. This form is very rare and I have but three collections.

SPECIMENS.—United States, O. M. Oleson; France, F. Fautrey; Portugal, Moeller.

ILLUSTRATIONS.—Quélet, t. 17, fig. 5, is a crude cartoon intended to represent this thick form of Fomes conchatus. The shape is about right, but the color more resembles a carrot.

FOMES LAMAENSIS.—Pileus applanate, with a smooth, hard brown or black crust. Context bright orange yellow (close to Raw Sienna), contrasting with the dark crust. Tissue of two kinds of hyphae, having large, thick, darker colored setae like hyphae imbedded in the usual type. (See fig. 600, page 261.) Pores minute, darker than the context. Setae numerous, rather thick. Spores (?) hyaline, globose, 5 mic.

This is an abundant plant in the East and a number of specimens are at Leiden, collected years ago in Java. They were referred to Fomes igniarius. Cooke got it from Tonkin years ago and referred it for Bresadola to Fomes marmoratus (sic.). Recently the Philippine collectors have found it in quantity, and Mr. Murrill described it as a "new species" twice on the same page (Fomes lamaensis and Fomes Williamsii). A year later he referred it to Fomes endothius, to which it has no affinity. I am not sure it is a Fomes, at least I have not noted true Fomes forms. Nor am I sure of spores. I have never found them. Murrill records them as hyaline; Bresadola indicates that they are colored. The hymenial cells are hyaline and I think also the spores. The bright color of the context is a marked feature of this plant to the eye, and the "structure" is also unusual under the lens. Fomes melanodermus (in Section 76) is a very similar plant, but has abundant colored spores.

Compare Williamsii.

FOMES RHEICOLOR.—Pileus applanate, with a dark, smooth crust. Context bright rhei yellow (brighter than yellow ochre Ridgway), hard, woody. Pores minute, concolorous or a shade darker. Setae rare. Spores not found.

This is based on a specimen received from Leon Castillon, Argentine. To the eye it closely resembles Fomes lamaensis, and we at first thought it was the same thing. However, we do not find the two forms of context hyphae that are so characteristic of Fomes lamaensis, of the East. Nor do we know Fomes lamaensis in the American tropics.

B.—Context Dark Brown.

FOMES IGNIARIUS.—Pileus ungulate (often resupinate or subresupinate), with a hard, black, usually rimose crust. Context dark brown (Argus brown), hard, woody. Pores minute, with concolorous tissue, and brown mouths. Pore layers 1-2 mic. thick. Hy-

phae deeply colored. Subhymenial layer hyaline, cellular. Setae rare, with swollen bases, projecting 12-16 mic. Spores globose, hyaline, 5-6 mic., smooth.

Fomes igniarius in its type form grows common on the willow in Sweden, but is found on various frondose woods. In the United States it occurs often on ash. On the willow it often takes a resupinate form. It is more common in northern localities. There has always been confusion in Europe in regard to the identity of Fomes igniarius. Fries and Persoon were in accord, as shown by their specimens. Berkeley, however, never had clear ideas in regard to it. In early American work he referred Fomes rimosus to Fomes igniarius, and in England his Fomes igniarius was always Fomes pomaceus, a tradition that persists in England to the present day. As to the French, they have never had it right apparently, and of the four specimens I found so labeled at Paris all were Fomes robustus, and all specimens labeled Fomes igniarius were the form Fomes nigricans. Boudier's figure of Fomes nigricans is typically Fomes igniarius for me.

ILLUSTRATIONS.—Boudier, t. 155 (as Fomes nigricans); Sowerby t. 132 (rather light color); Bolton's and Bulliard's figures are both too doubtful to quote).

SPECIMENS.—Many from Europe and United States. From foreign countries, I have only one doubtful collection, from Australia.

Compare Haematoxyli, hyperboreus, inaequalis, Novae-Angliae, Pandani.

FOMES NIGRICANS.—With the same context color, spores, setae, it is in reality the same plant as Fomes igniarius, differing only in its host (usually birch), its smoother black crust, and the setae, which usually are more abundant. At the best, it is only a form with a smoother crust. It is frequent in Europe and in America is far more common than the type form.

Much confusion exists as to the plant meant under this name, whether a black form of Fomes igniarius or a black form of Fomes fomentarius. It seems that Fries confused them. His original description and citation seem to apply to Fomes fomentarius (black form), and in this sense is taken by Bresadola. His specimens, however, both at Upsala and Kew, are the black forms of Fomes igniarius, as above.

SPECIMENS.—I have a number so labeled, but it is difficult to draw a line between the type forms and the variety. I have one from S. Kawamura, Japan.

FOMES ROBURNEUS.—For me, this also is a form of Fomes igniarius, or rather of Fomes nigricans. It is exactly the same, excepting there is a slight resinous exudation on the crust and the setae are quite abundant. The pore mouths are strongly silvery, glancing. Until I unearthed the type at Kew, the identity of Fomes roburneus was entirely unknown to recent European authors. Little can be decided from Fries' writings. His Icones 184 has no resemblance whatever to his specimens, and I believe it represents Fomes roseus.

Fomes roburneus, in the sense of Fries' specimen, is a slightly laccate form of Fomes nigricans, and is very rare in Europe, and, to my knowledge, does not occur in America. The name must not be confused with Fomes robustus, a frequent plant in Europe.

ILLUSTRATIONS.—None published. Those cited in Saccardo are both errors. Fries Icones 184, notwithstanding it is from Fries, does not represent his specimen at all, and Brefeld 8, t. 9-11, is an excellent illustration of Fomes annosus, with not even the slightest suggestion of Fomes roburneus. Others cited are copies of these errors.

SPECIMENS.—I have only one typical, viz., from Ant. Weidmann, Bohemia.

FOMES BOREALIS.—Pileus ungulate, with a thin, pale, smooth, hard crust, variegated with darker spots. Context hard, dark brown (Amber brown). Setae slender, numerous, dense. Spores hyaline, globose, 6 mic.

I found this on the birch at Temagami, Ontario. It is closely related to igniarius and nigricans. The marked feature is the dense setae on the hymenium.

**Fig, 590.**

Fomes squarrosus.

FOMES SQUARROSUS (Fig. 590).—Pileus ungulate, with a black, rough, rimose crust. Context hard, dark brown (Antique brown). Pores minute, round, with concolorous mouths. Pore layers indistinct. Setae few, slender. Spores hyaline, globose, 4 mic.

This specimen was sent by Rev. James Wilson, Victoria, Australia, but the host was not stated. Mr. Wilson sends also a fine photograph (Fig. 590). When received I supposed it to be Fomes rimosus, also a common species in Australia, and the photograph would represent either species. The context color also is similar, but the microscopic character, as will be noted above, are entirely different. This is a large species, the photograph being reduced to about one-third.

FOMES ZELANDICUS.—Pileus applanate, with thin, brown, smooth, zonate crust. Context reddish brown (near Sanford brown). Pores small, concolorous, with velutinate mouths. Setae abundant, with slightly swollen bases, projecting 16 mic. Spores not found, doubtless white. Hymenial cells white.

I think this is known only from New Zealand and Pacific Islands. The surface reminds me of that of Polyporus licnoides. The fungus in its main features, setae and velutinate pore mouths, recalls Fomes senex.

Compare Höhnelii.

FOMES EXTENSUS.—Pileus applanate, thin, 4-5, mm. thick, with a thin, black crust. Surface brown, dull, with raised zones. Context dark brown, hard. Pores very minute, concolorous, not stratified (in the type). Setae short, thick, with swollen base. Spores hyaline, perhaps pale colored, globose, 4 mic.

The type at Paris from Guadeloupe is all that is known to me. It closely resembles thin species of Fomes senex, but the spores are hyaline, and the setae of a different type. Murrill refers many collections from the West Indies to Fomes extensus which should have been referred to the species he "discovered" Fomes pseudosenex.

**SECTION 71.** CONTEXT BROWN. SETAE, NONE. SPORES COLORED.

A.—Context Light Brown.

FOMES RIMOSUS.—Pileus unguliform, with a black, rimose surface, usually very rough, no distinct crust. Context bright yellow brown (Raw Sienna). Pores minute, hard, annual layers 3-4 mm. thick. Pore mouths concolorous, when young velutinate to touch. Hyphae deep bright yellow. Setae, none. Spores globose, deeply colored, 5 mic.

The early history of this species is obscured by having been confused by its author (cfr. Fomes scabra). However, it proved a frequent species in many countries, and has been generally known to all mycologists for years under this name. It is the plant so referred in Fries' work and mostly Berkeley's, Cooke's, as well as most American authors. It is most abundant in the United States on the locust tree (Robinia) in the Middle West. In the East there are sections where it is more rare. Although the locust is very common as an ornamental tree in Europe (known around Paris as Acacia), this Fomes is only known in Europe from one specimen, now in Upsala, collected by Fautrey in France. The disease has not become established on the locust tree in Europe as it has with us in America. Fomes rimosus occurs also in various tropical countries. We have seen specimens from Jamaica, Mauritius, South Africa, India, Samoa, Ceylon.

SPECIMENS.—Typical—United States. Many collections, it being the common Fomes on the locust tree.

South Africa—Dr. H. Becker, I. B. Pole Evans, W. T. Saxton. It appears common in South Africa and exactly the same as United States form.

Samoa—C. G. Lloyd. Rare in Samoa. Only one collection was made, which grew on a large liane of the Leguminosae family.

New Caledonia—Specimen from Museum, Paris.

Ceylon—Petch, 3596 and 3597.

DEPARTING FROM TYPE FORM.

Ceylon—Petch, 3598. Surface paler, not rimose. No. 2781, crust black and smoother and shape applanate.

New Caledonia—Ex. Museum, Paris. Context darker and shape more applanate.

Australia—E. C. Stirling. Shape narrow, ungulate, and pores slightly larger.

ILLUSTRATION.—Our figure 590 of Fomes squarrosus could also be used to illustrate *this* species. For the camera, they are both the same.

Compare Cedrelae, endotheius, ignarioides, Robiniae, rudis, tuniseus.

FOMES BADIUS is quite close to Fomes rimosus, and distinguished with difficulty. It has the same general appearance, shape, surface, context color, but on comparison the surface is smoother, the pores are a little larger and also the spores, which measure 6-7 mic. The pore mouths are darker and soft to the touch. It seems to be quite a common form in several countries. It does not figure much in literature, for it is usually referred to Fomes rimosus. The type is at Kew. Klotzsch labeled it as coming from British America, but it was certainly from the tropics, where it is a common species. It is also the same as Fomes rimosus as to the Mauritius specimens, and Fomes Pappianus of my recent determination. It is much too close to (typical) Fomes rimosus for comfort.

SPECIMENS.—India, Karachi, D. F. O. Jerruck. Very abundant collections and surely the most common Fomes in that locality.

Uruguay, Dr. F. Felippone.

Compare Pappianus, Underwoodii.

**Fig. 591.**
Fomes scaber.

FOMES SCABER (Fig. 591).—Pileus unguliform, with a rough, light brown, uneven surface. Context brittle, soft, light brown (Buckthorn brown). Pores medium, irregular, long, reaching the crust. Setae, none. Spores in great abundance, pale colored, 4-6.

This is known only from an old type (Tasmania) at Kew, and a recent specimen received by me from Rev. James Wilson, Australia. We believe our specimen is the same on comparison with type, though color of crust and context is lighter, perhaps due to old age of the type. The spores too of the type are more globose and of deeper color. In very ancient history this was determined as igniarius var. scaber, by Berkeley, from Tasmania. Then he confused it with another species from Mauritius some years later and called both Fomes rimosus. No additional specimen of the

"scaber" type seems to have been received in Europe, but the Mauritius "type" turned out to be a frequent species in many countries, particularly the United States and South Africa, and has become well established under the name Fomes rimosus.

SPECIMENS.—Australia, Rev. James Wilson.

FOMES NIAOULI.—Pileus unguliform, or thick, applanate, with dark brown or black, matted, tomentose surface. Context color dark brown (Argus). Pores minute, with concolorous tissue and darker brown velutinate mouths. Setae, none. Spores globose, 6 mic., deeply colored.

The original is from New Caledonia. The type is the same as Fomes rimosus in context color, spores a little larger, but if it has any value as a species distinct from Fomes rimosus, it lies in its surface characters. In another collection I have the context is darker, and this agrees with Fomes badius, except as to surface. It is compiled in Saccardo as Polyporus, due to Saccardo not being able to translate Patouillard's dialect.

SPECIMENS.—Cotype, from P. Hariot.

Compare Merrillii.

FOMES FASTUOSUS.—Pileus thin, ½-1 cm., sessile. Surface dark brown, dull, with raised zones, minutely velvety. Context yellow brown (Raw Sienna), hard. Pores minute, round, concolorous, or slightly darker, 2-4 mm. long. Hyphae deep yellow. Setae, none. Spores globose, 4-5 mic., deeply colored. Known to me only from the type at Paris from Singapore, and at Berlin specimens from the Philippines. Léveillé so named three specimens at Paris: the type from Singapore, no setae; from Iles Seychelles with setae, and which is Fomes senex; from Brazil a specimen which is Polyporus gilvus. Fomes fastuosus is a thin plant, perhaps a Polyporus.

**Fig. 592.**

Fomes rhytiphlœus.

FOMES RHYTIPHLOEUS (Fig. 592).—Pileus applanate, with a hard, smooth, sulcate, pale crust. Context bright rhei. Pores minute, dark colored. Setae, none. Spores globose, colored, 4-5 mic., smooth.

This species, remarkable for its pale crust, bright colored context, dark pores, is known only from one old specimen in Montagne's herbarium. It came from Brazil.

FOMES JAVANICUS.—Pileus applanate, smooth (2 x 3 x 5 cm.), with a hard, black, rimose crust. Context bright brown (ochraceous-tawny), hard. Pores minute, with concolorous tissue, and stuffed mouths. Setae, none. Hymenial cells white. Spores (B) "flavidae," 3-3 ¾ x 4-5.

This was collected in Java recently, and referred to Fomes inflexibilis as a variety. I think it different from Berkeley's plant in black crust, much brighter context, and also spores (if they are yellow). I consider the spores of inflexibilis as hyaline. The only specimen I have seen is at Kew.

FOMES MINUTULUS (Fig. 593).—This is a small plant, with the same crust, context, and pores as Fomes fomentarius, and to the eye appears to be a small specimen of fomentarius. It is quite different, however. The fresh specimen has the pore mouths white, strongly glaucous. The spores in abundance are subglobose, pale colored, 4-5 mic.

Fig. 593.

The plants are small (about 2 cm. thick). Still it is not well named, for they are not really "minute," and there are several Fomes more "minute." Henning's named the plant from Africa, and it has been reported from Borneo. There are good, fresh specimens at Kew and Paris.

FOMES GLAUCOPORUS.—Pileus applanate, large, with a rough, sulcate, brown crust. Context pale brown (tawny olive), with concolorous pore tissue. Pores minute (⅕ mm.) with walls about the same thickness, in distinct layers, 2-4 mm. thick. Pore mouths white, glaucous when fresh, when rubbed, light brownish olive. Setae, none. Spores pale colored, subglobose, 4-5 mic.

This was quite a large specimen received from Henri Perrier de la Bathie, Madagascar. It is unusual in this section because of its pale,

brown, context color and glaucous pore mouths. I know no other similar species with brown context that has glaucous pore mouths, excepting the preceding. It is very close to Fomes minutulus as to its context, color, and spores.

B.—Context Dark Brown.

FOMES RIBIS (Fig. 594).—Pileus thin, applanate, (5-8 mm. thick.) Surface at first velvety, at length furrowed, uneven, with soft ridges. Context cinnamon brown. Pores minute, concolorous. Setae, none. Spores small, subglobose, 3 mic., colored.

**Fig. 594.**
Fomes Ribis.

Fomes ribis is quite a frequent species both in Europe and America on the garden species of Ribis. It usually grows imbricate, near the base of the plant. It occurs also on Euonymus and Lonicera in Europe, never in America, to my knowledge. There are records of it growing on Symphoricarpos in the United States. The Fomes on Euonymus and Lonicera have distinct names in Europe, Fomes Euonymi (generally spelled Evonymi in Europe) and Fomes Lonicerae. They have long been held to be the same as Fomes ribis. My observations are that the forms on Euonymus are usually of a brighter color than that on Ribis, but otherwise are the same.

ILLUSTRATIONS.—Although a common plant, it has been rarely figured. The old figures, Flora Danica, t. 1790, and Bulliard, t. 454, Fig. E, are both very inaccurate, if correctly referred. The figure of Corda in Sturm's Flora, Vol. 3 t. 62, is the only good one I have noted.

SPECIMENS.—Many, Europe and United States.

Compare Evonymi, Langloisii, Lonicerae, versatilis.

FOMES PECTINATUS (Fig. 595).—Pileus thin, rigid, applanate, 2-4 mm. thick, usually irregular, with the pore layers developing in imperfect layers. Surface with soft, tomentose, concentric ridges. Context cinnamon brown, bright color in fresh specimens. Pores minute, with mouths concolorous. Setae, none. Spores small, 3½-4, colored.

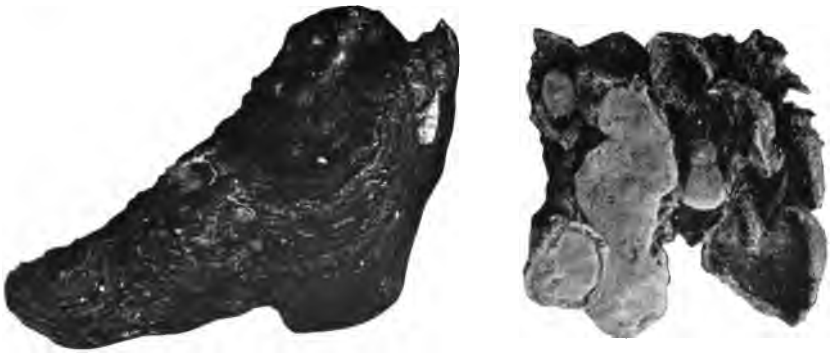

**Fig. 595.**
Fomes pectinatus.

A frequent plant throughout the tropics. There was more truth in Fries' reference than he supposed when he referred Quélet's figure of Fomes ribis to Fomes pectinatus, for Fomes pectinatus is in reality the tropical form of Fomes ribis. It is thinner and more irregular, but in all its essential characters is the same. Where the European compilers are in error is when they represent that both grow there. In the American tropics the plant otherwise the same, is of more regular growth than in the East. This was called Fomes subpectinatus by Murrill, and recently distributed by Rick as Fomes capucinus.

ILLUSTRATIONS.—None published. Quélet, Vosges, t. 17, fig. 5, (cited in Saccardo) is a mere daub and represents nothing. It was called Fomes conchatus by Quélet; was referred to Fomes pectinatus by Fries, which was the source of the Fomes pectinatus delusion in European mycology. It was based on Fomes ribis.

SPECIMENS.—Madagascar, Perrier de la Bathie (five collections); Brazil, Rev. Rick (four collections); Ceylon, T. Petch.

Compare Bonianus, crocitinctus, Hasskarlii, Langloisii, lilliputianus, subpectinatus, verruculosus, versatilis.

FOMES PULLUS.—Pileus small, thin, rigid, applanate, usually about 1 cm. in greatest diameter. Attached by a reduced base. Surface tomentose, with thin, narrow, tomentose ridges. Context and other characters as in Fomes pectinatus.

This might be held as a small, regular form of Fomes pectinatus, with which it agrees, excepting its small size, regular form, and separate manner of growth. It was originally from Java, collected by Zollinger and named by Montagne. Cotype collections (Zoll. No. 1000) are in most museums.

SPECIMENS.—Madagascar, Perrier de la Bathie.

FOMES JASMINI (Fig. 596).—Pileus small, about 5 mm., often scutellate, irregular. Surface minutely tomentose. Context and other characters as Fomes pullus.

**Fig. 596.**
Fomes Jasmini.

A very little species which is rare, growing, as far as known, only on the Jasmine in Southern Europe. It is quite close to Fomes pullus of the tropics. It was named by Quélet in his last paper and not included in his Flore. It is compiled in Saccardo as a variety of Fomes pectinatus.

SPECIMENS.—Portugal, Rev. Torrend; France, H. Bourdot.

FOMES McGREGORI.—Pileus semiresupinate, with reflexed, narrow pileus. Surface sulcate, zoned, pubescent brown. Context hard, dark brown (Argus brown). Pores minute, concolorous, with dark mouths. Setae, none. Spores elliptic, colored, 3 x 5.

A recently-named species from the Philippines and only known from types. It is quite close to Fomes badius as to context color and pores. Differs in its smaller, elliptical spores and subresupinate habits.

SPECIMENS.—Cotype, E. D. Merrill, Philippines.

Compare aulaxinus.

FOMES DEPENDENS (Fig. 597).—Pileus narrow, ungulate, attached behind. Surface dark, rough, sulcate. Context dark brown (Argus brown), hard. Pores minute, in many layers, tissue concolorous, mouths paler with a glancing effect. Setae, none. Spores globose, colored, 4 mic.

This is a marked species of the American tropics. It is very hard and heavy, and seems to be characterized by its shape and attachment. There are collections at New York from the West Indies, and I have one from Brazil. The plant is quite close, if not the same, as Fomes Caryophylli of the East.

SPECIMENS.—Brazil, Madame Anna Brockes.

FOMES CARYOPHYLLI.—Pileus ungulate or subresupinate, with a hard, black, smooth, slightly sulcate crust. Context hard, cinnamon brown. Pores minute, round, with distinct annual layers. Setae, none. Spores abundant, globose, colored, 4-5 mic.

Though recently named (as Trametes Caryophylli), this appears to be a common species in Africa and the East. It was named by Raciborski, a Russian writer on parasitic Java plants. The recent

**Fig. 597.**
Fomes dependens.

pores when fresh are deep (Argus) brown, but they soon seem to fill with hyaline hyphae and become much paler, and this seems to be a constant character. In Java all collections I have seen are mostly small, an inch or two thick, but I have it from Mauritius three or four inches thick.

SPECIMENS.—Ceylon, T. Petch (three collections); Java, sent by Bresadola; Mauritius, P. Koenig; Japan, A. Yasuda.

The Mauritius specimen, 4 inches thick, is much larger than those from Ceylon or Java. The Japanese specimen is to me somewhat doubtful. It is thinner, and the pores show no evidence of changing color with age, as they do in all my other collections.

FOMES PSEUDOSENEX.—Pileus applanate (2-3 cm. thick), with a hard, rough, irregular, sulcate, black surface. Context reddish brown (Argus brown), hard, rigid. Pores minute, hard, concolorous, in many distinct, narrow layers, with narrow layers of context often interposed. Setae, none. Spores globose, deeply colored, 4 mic.

The species is one of the hardest, heaviest, rigid Fomes. Several collections are known from Cuba and Central America. Montagne confused it (from Cuba) with Fomes senex (from Chile), and the specimen from Cuba was the one he sent Fries as Fomes senex. I am at a loss to explain how Fries could see any relation between it and Fomes graveolens, but he did, and his passing remarks evidently led Cooke to class Fomes senex in section "Merismoidea, with pilei emanating from a common trunk or tubercule," where it is found to-day in Saccardo, Vol. 6. It has not even the most remote suggestion of any such pileate development. Smith collected it in Central America and sent it to Ellis, who had it determined in Europe (as Fomes senex), evidently on comparison with Montagne's Cuba specimen. There is no evidence that Murrill knew what Fomes senex was. He renamed it as a "new species" from the Philippines. But he probably judged on general principles that Ellis' specimen was misdetermined, so he renamed it Fomes pseudosenex. The only relation it has to Fomes senex is the confusion with it.

The specimen Montagne sent Berkeley as Fomes senex was not the Cuban collection that he sent Fries, and Berkeley's determinations of Fomes senex are mostly right. When Berkeley got Fomes pseudosenex he referred it to Fomes rhabarbarinus, or rather misreferred it, for microscopic characters are quite different. Murrill, in addition to naming it Fomes pseudosenex, referred most of the specimens he got to Fomes extensus.

SPECIMENS.—Madagascar, Henri Perrier de la Bathie.

FOMES HYDROPHILUS.—Pileus small, with a brown, rugulose, sulcate surface (context dark brown). Pores small, with a noticeable sheen on the mouth. Spores abundant, subglobose, 4½-5, deeply colored. Setae, none.

A light-weight species, represented at New York by one abundant collection from Jamaica. I have none of the type, hence I am unable to compare its context color and have only scanty notes on the species. I was impressed, however, that it is a good species, and that its most prominent character was its very light weight.

FOMES TEPPERII.—Pileus ungulate, with black, rimose surface. Context dark brown (Russet). Pores large, long, seemingly not stratified. Setae, none. Subhymenial cells forming a thick layer. Spores are many, subhyaline, 6-7 mic., globose; few are deeply colored, same size and shape.

Fomes Tepperii, based on a single little specimen which I would not name were it not such a characteristic thing. The general appearance to the eye, the color and pores are those of Trametes pini, which, by the way, would be better as Fomes than Trametes, for it forms distinct pore strata. The varying spore colors of this plant demonstrate that having "colored spores" is not always a better character than any other one character.

**SECTION 72.** CONTEXT BROWN (ORANGE BROWN IN ONE SPECIES). SETAE PRESENT. SPORES COLORED.

A.—Context Light Brown.

FOMES YUCATENSIS.—This is similar in every particular to Fomes rimosus, excepting that it has setae. They are thickened at the base, and pointed. At New York there are specimens from Central America, and at Paris I have noted a specimen from New Caledonia (determined as Fomes rimosus), but which is characterized in the same way. Also from Africa, where it was called Xanthrocus rudis, it being the third time the specific name rudis was applied to an (alleged) Fomes.

Compare rudis.

FOMES SARCITUS.—Pileus applanate, rather thin, (1½ cm., with thin edge). Surface black, rimose, at length fibrillose, lacerate. Context bright brown (Raw Sienna). Pores minute, with concolorous tissue, but with darker, velutinate mouths. Hyphae deeply colored. Setae, rare. Spores small, 3-3½ mic., globose, deeply colored.

This species from the West Indies, type preserved in a jar at Upsala. It seems rare, at least there is no additional material in the abundant collection from the West Indies at New York. I have a collection from Trinidad, same on comparison as the type, but the spores are a little larger (4-4½ mic.).

SPECIMENS.—Thos. Langton, Trinidad.

FOMES OSTRICOLORIS.—Pileus large, hard, woody, with obtuse margin. Surface sulcate, black, rough. Context bright yellow brown (ochraceous-tawny). Pores minute, with concolorous tissue and dark purplish, velutinate mouths. Setae abundant, with swollen bases. Spores globose, pale colored, 3½ x 4.

This was received from Edouard Luja, Congo, Belge. In the grosser features it is very similar to Fomes torulosus, from which it differs in colored spores. The velutinate, dark purple pore surface is a marked feature.

FOMES RHABARBARINUS.—Pileus applanate, (5 x 6 x 1 inch), with a thick, hard, smooth, ridged, black crust. Context light yellow brown (near ochraceous tawny), hard, woody. Pores very minute, with concolorous tissue, but brown mouths. Setae, short, thick, projecting 10-12. Spores not found. (The hymenial elements are all deeply colored, and the spores are probably colored, though it is strange they are not in evidence.)

This is known from a single specimen at Kew. When Berkeley published it he overlooked the label (attached to the underside), and stated that it had no label and was probably from Brazil. The label (by Klotzsch) states it was collected by

Richardson. It was from British America, unless Klotzsch made a mistake, for he labeled it "No. 4, Richardson," and all Richardson's collections are from British America. I believe Klotzsch did make a mistake, and that this is a tropical species, just as I am sure that he made a mistake in publishing Irpex flavus as being from "Amer. Borealis Dr. Richardson." Irpex flavus is surely a tropical species only, and I believe this is. Berkeley afterwards referred quite different species from Cuba and Brazil to Fomes rhabarbarinus. (Cfr. Fomes pseudosenex.)

FOMES SANFORDII.—Pileus thin, applanate, with acute edge (about 1 x 3 x 3 cm.). Surface reddish brown, sulcate, with a hard, tomentum, separated from the context by a narrow black line. Context orange brown (Sanford brown), hard, about 2 mm. thick. Pores minute, darker than context, with concolorous mouths. Setae with strongly inflated bases. Spores subglobose, 3½ mic., colored.

We receive this from T. Petch, Ceylon. It has some characters in common with Fomes ribis, but differs from all species in this section in its distinct orange brown context.

SPECIMEN.—T. Petch, 3446, Ceylon, type.

FOMES RHAPONTICUS.—Pileus applanate (3-5 inches by 1-2 inches thick), with smooth, brownish surface. Context bright yellow brown (yellow ochre), with a peculiar, shiny effect and faintly zonate. Pores subconcolorous, minute, the indistinct layers 5-6 mm. thick. Setae rare, acute, with swollen bases. Spores subglobose, 8-10 mic., smooth, colored.

The context is not hard and lignescent as in most Fomes, and I rather suspect it is better classed as a lignescent Polyporus, related to Polyporus dryadeus. The distinct pore layers, however, can be distinguished, and hence it must be classed as Fomes, until at least we learn more of its life history. In general appearance, context color, and texture this is close to Polyporus dryadeus, an annual species of Europe with white spores.

SPECIMENS.—Jintaro Umemura, Mikawa, Japan (Type), G. Yamada, Japan. The specimen from Yamada has no annual layers, and would be called Polyporus. It has also darker context and surface than the type.

B.—Context Dark Brown.

FOMES EVERHARTII.—Pileus ungulate, with a black, sulcate, often rimose surface. Context hard, color dark, reddish brown (burnt sienna). Pores minute, in very distinct annual layers, 5-6 mm. thick. Pore tissue and mouths concolorous. Setae abundant, large, slender, 30-45 mic. Spores globose, deeply colored, 5-6 mic.

This is a frequent species, usually on oak in the United States. It occurs from the Atlantic coast into Southwest Texas and is quite abundant in the Southwest. The colored spores and setae readily distinguish it from all our other American species. It is only known from America, and I have never noted any specimens from tropical America. Ellis sent it to Cooke, who called it Fomes igniarius. In

describing it, Ellis referred it to his "new genus" Mucronoporus, based on the setae, but the idea does not seem to infect anybody else.

SPECIMENS.—Many from United States.

Compare praerimosus.

FOMES SENEX (Fig. 598).—Pileus applanate, sometimes quite large, with brown, rugulose surface without distinct crust. Context medium brown (Sedan brown). Pores very minute (100 mic.), indistinctly stratified, the tissue concolorous with the context.

Fig. 598.
Fomes senex.

Pore mouths darker brown, soft, velutinate to the touch. Setae very abundant, rather short and thick, projecting 12-14 mic. Spores scanty (hyaline when young no doubt), globose, 5 mic., deeply colored.

This species came originally from Chili, but is rare in American tropics, and is not represented in the abundant collections at New York made in the West Indies and other parts of tropical America. It is extremely common in Africa and the East, and particularly in Java. The spores have been described as hyaline or sub-straw color, but I have seen them deeply colored in the type, and others which I

took to be young were pale or hyaline. Some specimens have many spores. Still I have made many examinations without finding spores, and it is rare to note a species with colored spores that are ever scanty. The pore layers extend almost to the crust, with very little context. I have one collection from the Philippines with a distinct, dark purplish coat to the velutinate pore mouths.

Fomes senex came originally to Montagne from Chile (Bertero). Afterwards Montagne confused matters by so referring an entirely different plant from Cuba (compare Fomes pseudosenex), which he sent to Fries. Berkeley had some of the original, hence Fomes senex of Berkeley's determination was usually right. In recent years Murrill discovered it was a new species, Fomes subextensus from the Philippines. Bresadola calls it Fomes Korthalsii, and I have taken the types of Fomes Hasskarlii at Leiden to be this plant. The whole history has been a bad muss, which is a pity, since it is such a common and characteristic plant.

SPECIMENS.—Brazil, L. Damazio; Hawaii, C. N. Forbes; Samoa, C. G. Lloyd; Philippines, E. D. Merrill; Ceylon, T. Petch; India, H. C. Ryan; Java, Docteur van Leeuwen, J. P. Mousset, Dr. J. C. Konigsberger; Mauritius, P. Koenig; Madagascar, Henri Perrier de la Bathie; South Africa, I. B. Pole Evans, W. T. Saxton.

Compare Langloisii, Hasskarlii, subextensus.

Fig. 599.

Forms.

FOMES HAWAIENSIS.—Color bay, pore mouths 150 mic., otherwise as Fomes senex. Surely only a form, but of quite distinct color (bay) and pores one-half larger. Based on a collection from C. N. Forbes, Hawaii.

FOMES VELUTINOSUS (Fig. 599).—I have several times received a small, thin plant with the main characters of Fomes senex, but much smaller, thinner, and with but one layer of pores (Polyporus). I am not sure it is a Fomes, as my collections show no Fomes layers. Surface smooth, sulcate, often with a banded effect. Pore mouths darker and strongly velutinate.

SPECIMENS.—Bengal, S. Hutchings; Japan, K. Makanishiki, Kazegoti Island; Madagascar, Henri Perrier de la Bathie; India, Col. H. R. Kirtikar; Natal, Africa, A. J. T. Janse.

FOMES PACHYPHLOEUS.—Pileus ungulate, with a hard, smooth, uneven brown or black crust. Often the crust is variegated with darker zones. Context hard, medium brown (Sedan brown). Pores minute, with indistinct pore layers. Setae short, with broad bases. Spores rare, globose, 8 mic., pale colored. The tissue of the pore walls and context is mostly of the usual ligneous hyphae, slender, 2-4 mic. thick, colored, but imbedded in this tissue, of much darker color and running parallel with the pores, are prominent, deep chestnut-colored, smooth, sharp setae 8-10 mic. thick, with sharp points. These are quite conspicuous under the microscope and occur both in the pore and context tissues.

Fomes pachyphloeus was originally from Fidji, but is found frequently in Africa and the East. I have not seen it from the American tropics. Sometimes it

reaches a very large size. There is a specimen at Leiden from Java nearly eight feet in circumference and weighing over 20 pounds.

The large, thick, deeply colored setae-like hyphae that are imbedded in the tissue (Fig. 600) are the most remarkable feature of this plant, but were only referred to vaguely as "cystides volumineuses" in the original accounts, and it is only recently that special attention was drawn to them. I think they are mistermed as

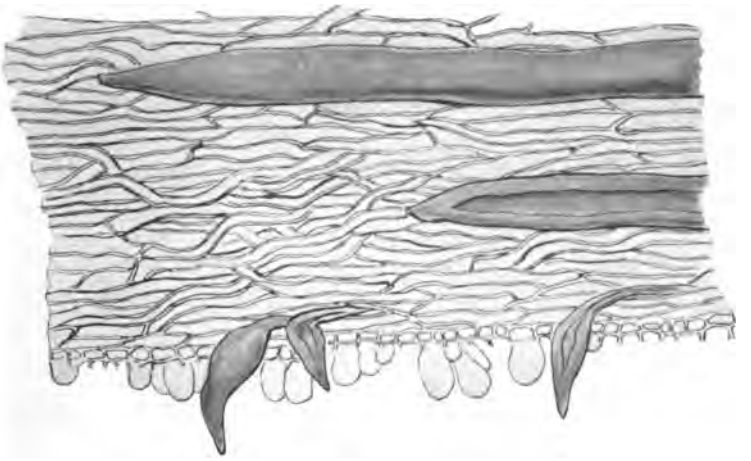

**Fig. 600.**

Section of pore walls of Fomes pachyphloeus (much magnified).

cystidia in any possible meaning of this elastic word. It is of quite peculiar "structure," but other species, Fomes lamaensis, Polyporus Chaperi, glomeratus, Rickii, and others have similar structure. Some day some bright savant will discover that this structure forms a "new genus." Prof. McGinty proposes for it the name Oxyuris.

SPECIMENS.—Philippines, E. D. Merrill; Mauritius, Chas. O'Connor; Madagascar, Henri Perrier de la Bathie.

Compare Elmeri.

FOMES MELANODERMUS.—Pileus ungulate, with a rough, hard, black crust. Context dark, brown (antique brown). Hyphae of two types, thick seta-like, darker hyphae imbedded in the lighter colored, thinner hyphae of the usual type. Pores minute, concolorous, in many distinct layers, 3-4 mic. thick. Setae rather thick, with thick bases. Spores abundant, globose, pale colored, 4 mic.

It appears to be rare, and is only known from Java. The only specimens I have seen are the one at Kew and the type in Patouillard's herbarium. It is very close to Fomes lamaensis and has same "structure," but differs in its abundant, colored spores.

FOMES LINTEUS.—Pileus applanate, thin (5 mm. thick), with brown, slightly tomentose surface, strongly sulcate, with con-

centric, raised ridges. Context thin, dark brown. Pores minute, with concolorous tissue and darker mouths. Setae very few, slender. Spores globose, 4-5 mic., very pale color.

This is known, I believe, only from the type at Kew from Nicaragua. The determinations at New York are in error, also Baker's distribution No. 2259, so determined by Burt, which is Fomes rimosus, with no remote resemblance to Fomes linteus. I am not even sure that linteus is a Fomes. It seems harder, but it is very close to Southern forms of Polyporus gilvus, and the type has no layers of pores. The "lime-white hairs" that clothe the pileus, according to Mr. Murrill's account, are quite noticeable by their absence.

FOMES CALCITRATUS.—Pileus applanate, with thin edge, with a hard, brown, smooth, sulcate crust. Context dark brown (cinnamon). Pores very minute, concolorous, with hard pore mouths. Setae rare. Spores (W.) colored, 5-6 mic.

This, I think, is known only from the type (Wright 816) from Cuba at Kew. At Paris and New York (also at Kew) Wright 264 (which is Fomes pseudosenex), is labeled as being Fomes calcitratus, and the account in N. A. F. was based on this mislabel.

NOTE.—Polyporus Caryophylleus from Brazil has been classed as a Fomes and would fall in this section. It has rare, colored setae and colored spores. I think it is better classed as a lignescent Polyporus. It must not be confused with Fomes Caryophylli from Java.

## 7TH GENERAL DIVISION—GANODERMUS.

The section Ganodermus of Fomes rests on the spore character. The colored spore has a hyaline membrane, which is large and projecting at the base beyond the colored endospore. This empty base usually collapses, then the spore becomes truncate at the base. In addition, the cortex is brown and the pores are always devoid of setae. This section in the broad sense, as used by Patouillard, is quite natural as far as spores and context are concerned. The name (as a genus) is coming into use in Europe in this sense, chiefly due to having been adopted by Bresadola, and is the only one of Patouillard's polyporoid genera that Bresadola recognizes. After struggling against it for twenty volumes, Saccardo finally succumbed in the twenty-first volume. In his previous volumes he had taken Ganodermus as a synonym for Fomes, which it is not, although a few Fomes are Ganodermus, and these alone are considered here under this head. The species of Fomes in this section are very puzzling. There is little microscopic difference. The spores are all very much the same, a little variation in size, but no more than is often observed in different spores of the same specimen. Two of the rare species have distinctly rough spores, but this helps but little, for the bulk of specimens have smooth or punctate spores. The context color is quite similar. The main difference is in the crust, which is quite marked in extreme forms, but runs together in such gradations that it is difficult to use as a character. In old times it was customary to call everything that grew in temperate regions in this section Fomes applanatus, and in the tropics, Fomes australis. It was a practical idea at any rate, even if most of the specimens could not be distinguished without the locality being known. In modern days the tendency is just the other way, and tropical species are based on indistinguishable characters that we are unable to follow.

Large numbers of tropical collections have been secured for our museum, and we have carefully worked them over and sorted them according to the most obvious macroscopic characters. The most prominent distinction is a marked difference in the relative weight.

One series, which we call Ponderosus, is heavy, hard, compact, with very minute, heavy pores, hardly visible to the eye. The microscope shows these pores 50 mic. in diameter, with thick walls 250 mic. (Fig. 601). This series only occurs in the tropics and is unusual there.

Fig. 601.

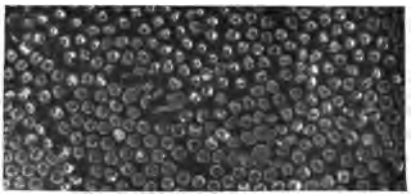

Fig. 602.

Section across the pores, ( X 12 )

The other series is light in weight compared with the preceding, we judge about one-third as heavy. It has thin walled pores 120 mic. in diameter, with thin walls, only 60 mic. (Fig. 602). It is the common and only series in temperate regions, but is also common in the tropics.

Most Fomes of this section Ganodermus do not have laccate crust, a character that is prevalent in the section Ganodermus of Stipitate Polyporus.

The color of the pore mouths has never been held of any importance in classifying this group of plants. Still the difference between plants with white pore mouths and those with yellow pore mouths seems to us of some importance. It is usually constant in every specimen of the same collection. They are either all yellow or all white. And it is also geographic. In Europe only one rare species, Fomes laccatus, has yellow pore mouths, and it is a constant character of the species. In the Eastern United States the commonest of all common species, Fomes leucophaeus, has white pore mouths. On the Pacific Coast most specimens we received have yellowish pore mouths, and in the tropics we get specimens with deep yellow pore mouths.

### SECTION 73. FOMES-GANODERMUS.

A.—Pores with Thin Walls. Spores Smooth or Punctate.

FOMES APPLANATUS.—Pileus usually applanate, with a brown, rather soft crust when fresh. Context color dark brown (bay brown). Pores minute, with brown tissue and white mouths. Spores colored, obovate, 6 x 10, truncate at base, with smooth, punctate surface.

This is a frequent species in Europe, and in various forms is cosmopolitan, and usually the commonest Fomes in any locality. The type form in Europe has a pileus often large, 1-1½ foot in diameter and 2 to 4 inches thick. It has a brown crust, which in the growing plant is soft so that it can be indented with the fingernail. The pore mouths are white, and amateur artists often etch by cutting the white surface, exposing the brown tissue beneath. Specimens of Fomes applanatus (and the form Fomes leucophaeus) often have the pileus covered with a dense coat of brown spores. It is somewhat a mystery how they get there. That they are in part conidial has been demonstrated by sectioning the pileus layers, and we have seen abundant conidial spores attached to the hyphae. They are exactly the same in every respect as the spores one finds in the pores. But that they alone can account for such abundant spores as one often observes is difficult to believe.

The early history of Fomes applanatus is somewhat obscure. Sowerby confused it in the text with Fomes fomentarius, and Persoon first lists it as a variety of Fomes fomentarius. Schweinitz determined the American form as being Fomes

fomentarius, and Berkeley confused it in all his works, a confusion that still exists in the English text-books.

In Europe Fomes applanatus in the type form with soft, brown crust is the usual form, though it grades frequently into the next form Fomes leucophaeus. In the United States and Japan the usual form is Fomes leucophaeus, though the type of Europe rarely occurs, and innumerable gradations are found. In the tropics Fomes applanatus often takes a form exactly the same as the European form, but generally the crust is hard and brown, and then it is classed as Fomes australis.

The shape of Fomes applanatus is generally applanate, but sometimes ungulate specimens occur. Sometimes layers of tissue are interposed between the pore layers, then it becomes Fomes vegetus, but this is a condition, not a species.

ILLUSTRATIONS.—Sturm's Flora, fasc. 14, t. 63 is good as to color, but of abnormal shape. The spores are also inaccurate. Gillet's figure is the best, though the context color is much too light. Bulliard, t. 454, fig. C, also good as to shape, but inaccurate as to context color.

SPECIMENS.—We have about fifty collections from Europe, but only six from United States that we so refer with white pore mouths.

Foreign, not distinguishable from the European plant. India, H. Val. Ryan; Japan, J. Umemura; Ceylon, T. Petch; Madagascar, Perrier de la Bathie; Australia, W. M. Carne, W. W. Froggatt; New Zealand, R. S. Robinson; Philippines, E. D. Merrill; Brazil, L. Damazio.

Compare gelsicolor, Lipsiensis, megaloma, rubiginosus, scansilis, vegetus.

Variations.—As to the crust, the plant varies in all degrees into Fomes leucophaeus, and no line can be drawn between them. The pore mouths are white. We have two collections from Europe with yellow pore mouths that, as to crust, should be classed with Fomes applanatus. They both grew on beech, however, and incline toward Fomes laccatus, excepting as to crust. Our California collections mostly have yellow pore mouths.

FOMES LEUCOPHAEUS.—Crust hard, pale or white, otherwise exactly the same in context color, pores, pore mouths, and spores as Fomes applanatus.

This is the common form in the United States and our most abundant Fomes. While most specimens have a hard, pale crust, often the crust is brown, and the type form of Fomes applanatus with soft, brown crust rarely occurs in the United States. In most of our literature it has been called Fomes applanatus. The type of Fomes leucophaeus, typical, as described with hard, pale crust is in Montagne's herbarium. Murrill perpetrated a farce by calling it Fomes megaloma (on the grounds of priority and a guess), which not only does not rest on any evidence, but is directly contrary to the evidence that exists (see synonym). Bresadola in his recent naming follows Murrill's mistake.

In Japan, the United States, and probably most temperate countries, except Europe, Fomes leucophaeus is more common than the type form, Fomes applanatus.

SPECIMENS.—We have over a hundred collections from the United States which are typical in having a pale, hard crust and white pore mouths, but only six from Europe that we so refer. Foreign, Australia, Miss E. Campbell; South Africa, A. J. T. Janse; Japan, J. Umemura; A. Yasuda.

Compare incrassatus, concentricus, megaloma, Stevensii.

Variations.—Of the many specimens of this common plant we have seen we have only four collections with yellow pore mouths. We hardly feel it worthy of a separate name, though we think that biologically it is not the same as the usual form with white pore mouths.

Normally, Fomes leucophaeus is sessile, but when growing from roots or some other abnormal position they develop fictitious stipes, as shown in Sturm's Icones, fasc. 14, t. 63. We have two collections with lateral stipes that evidently grew horizontal. As it extends South the tendency to produce stipe-like bases is more pronounced, and we recently collected a small form in Florida with strong disposition in this direction. Finally we have it from Brazil, with a slender and distant stipe, but another specimen of the same collection is subsessile.

SPECIMENS.—South America, Leon Castillon, F. Theissen, Gus. Peckolt, Rev. Rick; Bahamas, L. J. K. Brace. One from Rev. Rick has a small, slender, true stipe. The others are abnormally stiped, we think.

FOMES FASCIATUS (bis.)—Surface dull, marked with pale and brown zones, otherwise as the form leucophaeus. The spores of our Java collections are none of them truncate at base, the membrane seeming not so strongly developed as usual.

This is a tropical form, the name based on a misdetermination by Léveillé. We do not think an acknowledged misdetermination has any validity as a name, but use it as we know no other for this form. Formerly we took the original Fomes fasciatus of Swartz in the sense of Fomes marmoratus of this pamphlet, but that view has been disputed by Romell, and owing to the doubt we have abandoned it.

SPECIMENS.—Java, J. C. Koningsberger (two collections).

FOMES AUSTRALIS.—In a narrow sense, this is a tropical form of Fomes applanatus, with a thin context and long pores.

It is a time-honored custom to refer every Fomes of the section Ganodermus that came from the tropics to Fomes australis. Murrill varies the proceedings by calling it Fomes tornatus, but the idea is the same. In the sense of Fries (type at Kew) Fomes australis was based on a form of Fomes applanatus with thin context, hence had "praelong" pores, but on comparison with the type form in Europe, we find it is in other respects exactly the same. The "type specimen," however, does not agree with Fries' description where it was described as having a "shiny, laccate crust," but it is just the contrary. It is a mistake to consider that Fries had any definite species, distinct from Fomes applanatus which he named Fomes australis, or that any one else has had in connection with this name. Fomes australis is a convenient name to which to refer the tropical forms of Fomes applanatus, but we would restrict it to those that have thin context and long pores.

SPECIMENS.—The following specimens agree with the type in having "praelong" pores and scanty context, but that it is distinct from Fomes applanatus we cannot believe. Japan, A. Yasuda; Natal, A. J. T. Janse; South Africa, I. B. Pole Evans; Congo Belge, Rev. H. Vandegrift; Jamaica, Wm. Kirkland, N. Y. Botanical Garden; New Caledonia, Museum Paris; Philippines, E. D. Merrill; Argentina, Leon Castillon.

Compare nigricans, chilensis, testaceus, tornatus, scansilis.

FOMES OROFLAVUS.—A tropical form of Fomes applanatus with yellow pore mouths.

Fomes applanatus, in European and American forms, usually has white pore mouths. A quite frequent plant in the tropics, otherwise the same has deep yellow pore mouths. We have never seen but one specimen from Europe that approximates this tropical form. We have several collections from the United States (particularly California), which we refer to Fomes applanatus (and rarely to Fomes leucophaeus) that have yellow pore mouths, but they are not the deep yellow of the tropical plant.

SPECIMENS.—Australia, Rev. James Wilson; Hawaii, C. N. Forbes.

FOMES NIGRO-LACCATUS.—Tropical forms of Fomes applanatus sometimes have a slight, black, resinous exudation on the crust. Such we think should be called Fomes nigro-laccatus, the only suitable name for them.

We consider this according to the evident idea that Cooke associated with the name, that is, assuming that he had an idea. The technical "types" (cited) are now endorsed as being two species, neither of them Fomes nigro-laccatus. As Cooke named several collections Fomes nigro-laccatus when the name was appropriate, we feel he should be credited with correct application of his name, at least in those cases where he applied it suitably. Fomes nigro-laccatus in this sense occurs only in the tropics. There is a specimen at Kew, from Cuba, but most are from Africa. We have it (?) from Japan.

FOMES GALEGENSIS.—Very similar to Fomes applanatus as to pores, context, and spores, but has a hard, thick, smooth, black (cracked) crust. The specimen on which the species is based is in a cupboard at Paris. We have noted

other specimens of Fomes applanatus, determined as being Fomes galegensis, but none with the same crust feature of the type at Paris. We hardly think it possible to maintain it even as a form.

FOMES (?) RENIFORMIS.—Same as Fomes applanatus as to crust, context color, pores, but differs in being annual and forming new pilei each year. The spores are distinctly rough, in some specimens at least. Morgan observed a plant to be annual that otherwise seemed the same as Fomes applanatus, a perennial plant. It can be generally recognized by bearing the dead pileus of the previous year. Whether it is a distinct species or not is a question, and also it is a question if it should be classed as an annual form of Fomes applanatus. The spores are certainly in some specimens more asperate, but otherwise we doubt if the pileus alone could be told from the first year's growth of Fomes applanatus, the type form of Europe, and we do not know that the spore difference is pronounced enough to distinguish them. It is quite frequent around Cincinnati, usually on rotten stumps near the ground. As it occurs fresh the pore mouths are white, but we have a number of collections (including a "type" from Morgan) with yellowish pore mouths. We think these with yellow mouths are entitled to a name, but we do not propose one.

SPECIMENS.—Many, mostly of our own collection.

Compare lobatus.

**Fig. 603.**
Fomes laccatus.

FOMES LACCATUS (Fig. 603).—Pileus thick, applanate, with uneven, dark reddish brown, strongly laccate crust. Context dark brown (bay brown). Pores minute, long, with brown tissue and yellow mouths. Spores truncate, obovate 6 x 12, with punctate surface.

This is a European species unknown elsewhere. Except as to its thick, laccate crust, it is similar to Fomes applanatus, but the pore layers are thicker (1½ to 2 cm. thick), the pore mouths yellow, and the plant is evidently of rapid growth. It occurs only on beech as far as we know. It was not included in Fries' work, hence there is hardly a definite tradition concerning it in European mycology. I have not seen any of Kalchbrenner's specimens, but he gave a good name to it, Fomes laccatus, and a good description, excepting he described the spores as globose and hyaline, which was a slight discrepancy, considering it was Kalchbrenner. It is not a rare plant in England. Cooke distributed it years ago as Fomes applanatus, and Plowright sent it to Rabenhorst, who also distributed it. There is no evidence that Berkeley ever knew it. Quélet met the plant and sent a specimen to Fries labeled Fomes flaviporus, but it was never published under that name. His specimen also reached Cooke, labeled Fomes resinosus, attributed to Schrader's vague description, which does not entirely agree. Quélet so published it, and cites Rostkovius t. 34, an evident error. Bresadola at first followed Quélet, but afterwards described it as a new species Fomes Pfeifferi. We believe, on the sacred laws of priority, it should be called Fomes resinosus (Schrader-McGinty), it being the only plant in Europe that answers at all to the original "description" of this much-bandied species.

SPECIMENS.—We have about twenty collections, all from Europe.

Compare flaviporus, Pfeifferi, resinosus.

**Fig. 604.**
Fomes annularis.

B.—Spores Rough.

FOMES ANNULARIS (Fig. 604).—Pileus narrowly ungulate, pendant, attached by a reduced base. Surface with a hard, brown, smooth, not laccate, crust, with narrow, concentric, raised, annular rings. Context scanty, dark brown (bay brown), the pores reaching the crust. Pores minute, with brown tissue and white mouths. Spores 7 x 12, obovate, truncate, distinctly rough.

This species rests on one specimen (Fig. 604) from W. T. Saxton, Cape Town, S. Africa. In its pore color, crust, white pore mouths, it is closely related to Fomes leucophaeus, but the shape is unusual in the Ganodermus section of Fomes, and the distinctly rough spores, quite remove it from any form of Fomes applanatus. At Kew we note several specimens in the australis cover that seem to be similar, but we have not examined their spores.

**Fig. 605.**
Fomes Petchii.

FOMES PETCHII (Fig. 605).—Pileus compressed, ungulate, with reduced pore layers each year, 8 cm. in diameter, 5½ cm. thick, attached horizontally by a reduced base. Surface dark reddish brown, with concentric, raised zones, strongly laccate. Context scanty, pale brown. Pores long (5 cm.), almost reaching the crust, minute, with brown tissue darker than the context. Spores 8 x 12, obovate, truncate, distinctly rough.

This is based on a single specimen sent from Ceylon by T. Petch as "perennial lucidus." It is a true Fomes, and in our opinion is not a form of Polyporus lucidus. Judging from the annual layer, the

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species is about twenty years old. These layers are 5-7 mm. thick at first and quite distinct, but are reduced both in thickness and area in later years, forming a peculiarly shaped, contracted pileus. This effect in this one specimen may be due to exhaustion of the food supply as the plant grows older.

**SECTION 74.** PONDEROSUS-FOMES-GANODERMUS.

Pores hard, heavy, minute, with thick walls (Fig. 601). Spores smooth or punctate.

FOMES SUBTORNATUS.—Pileus applanate, with a hard, rigid, black crust with brown surface. Context dark brown (bay brown). Pores very minute, hard, rigid, heavy, with thick walls. Mouths fuliginous. Spores 6 x 10, smooth, truncate.

This form was first clearly distinguished in Bresadola's work on Philippine fungi. It has a hard, rigid crust and dark, minute, hard, rigid pores, similar to the pores of Polyporus fornicatus and Polyporus mastoporus. The pore mouths are concolorous with the tissue. The young specimens sometimes show a slight black, laccate exudation, similar to that of Fomes nigro-laccatus. Originally it was described as having a short, lateral stipe, but specimens do not show it. The species is distinguished from the other Fomes of this section by the color of its pores and pore mouths, which are concolorous with the pore tissue.

SPECIMENS.—Philippines, E. D. Merrill (six collections); Madagascar, Henri Perrier de la Bathie (not typical); Java, J. P. Mousset; New Zealand, S. Duncan.

Compare piceus.

FOMES PSEUDOAUSTRALIS.—Pileus thick, applanate, with a thick, hard, black, shiny, sulcate crust. Pores very minute, hard, heavy, compact, in many layers, almost reaching the crust. Context and pore tissue dark brown (bay brown). Spores 6 x 10, smooth, punctate.

This is based on a Philippine collection, Curran 13748. It was referred to Fomes australis, but on comparison is quite different from the type of Fomes australis at Kew. The hard, heavy pores are similar to Fomes subtornatus. This answers the description of Fomes australis better than the type, but it is quite certain that it never grew in Europe, where Fries states australis occurs. This is probably the same as Fomes piceus, of which no authentic specimen is known to me.

Compare piceus.

FOMES POLYZONUS.—Pileus applanate, with a smooth, hard, pale crust. Context dark brown (bay brown), with narrow, regular zones 1½ mm. wide, and also with black layers of resinous tissue

imbedded, giving the effect of black lines in a section. Pores minute, hard, with yellow mouths. Spores 5 x 9, obovate, smooth, with many smaller, 4 x 6.

This was received by us from C. B. Ussher, Java, and at first we were inclined to refer it to Fomes leucophaeus, to which it is similar in crust and general appearance. The narrow context zones and paler context, as well as the interposed, resinous layers in the context and the minute, hard pores, are features never found in the common Fomes leucophaeus. I have similar plants from Java and Brazil, excepting that the context zones are not evident. Also a very doubtful collection from Madagascar, which, while the same as to pores and context, has a smooth, shiny, black crust.

SPECIMENS.—Java, C. B. Ussher (type), Dr. van Leeuwen; Brazil, P. Pio Buck (not typical); Madagascar, Henri Perrier de la Bathie (very doubtful).

FOMES KONINGSBERGII.—Pileus applanate, thin, 2-3 cm. thick, mostly reduced to the base, and most specimens have a false stipe-like base. Surface smooth, uneven, nonlaccate, varying from pale brown to fuliginous. Context dark brown (bay brown), with layers of imbedded, resinous tissue. Pores minute, with thick walls, hard, heavy. Pore mouth white. Spores 6 x 10, smooth.

A single, but very abundant, collection was received from Dr. J. C. Koningsberg, Java. We referred it with doubt to Fomes leucophaeus (cfr. Letter 38). We sent it to Europe and it was referred to Polyporus gibbosus, of which nothing is known excepting Nees' figure. To us it has no resemblance to that figure. It appears rare in Java, at least we have seen no others than the type.

SPECIMENS.—Java, Dr. J. C. Konigsberg, a very abundant collection (type).

**SECTION 75.** STIPITATE FOMES OF THE SECTION GANODERMUS.

In our pamphlet on the Stipitate Polyporoids we took the ground that there were no truly stipitate species of Fomes. Specimens we had seen we referred to sessile species, believing them to have accidental stems. We have received several specimens from the tropics that certainly have normal stems, and we are convinced that it is a good specific character. In one species from Java both stipitate and sessile specimens occur, but that does not necessarily void the value of the character.

Should we revise the subject, we would make this Section 75, the second section of stipitate polyporoids.

FOMES TESTACEUS.—Pileus with a lateral, deformed stipe. Crust smooth, not laccate, castaneous brown, variegated, zoned. Context bay brown. Spores minute, with white pore mouths. Spores 6 x 10, smooth.

We use the name in the sense of Patouillard to avoid inventing a new one. In the sense of Léveillé, the "type" has no stipe, and we believe it to be only the usual tropical form of Fomes applanatus. We have three collections that we refer here—our own, Samoa, Machardo, Perak, and Rev. Rick, Brazil. The two former have

deformed stipes, but that from Rev. Rick has a regular well-developed stipe. The context and surface are much like a brown form of Fomes applanatus. Neither of my three collections is a true Fomes, but the Eastern ones appear to be of this nature. The Brazilian specimen has narrow spores, 5 x 12, and is probably a different species.

SPECIMENS.—Perak, M. A. D. Machardo; Samoa, C. G. Lloyd; Brazil, Rev. J. Rick, the latter probably distinct.

FOMES ZONATUS.—Pileus applanate, sessile or often with a lateral stipe. When young, with a bright coppery brown, laccate, smooth, often sulcate surface. Context soft, of light weight and texture, dark bay brown color, with narrow zones. Pores minute, with brown context and pale, slightly laccate mouths. Spores 6 x 10, truncate, smooth, punctate.

This is a most abundant species in Florida, always growing on Cabbage Palmetto trunks. It is remarkable for the soft, light texture. Sometimes it is distinctly stalked with a lateral stem, at other times sessile with a broad attachment. Many species in the section Ganodermus have a resinous exudation on the crust, but this is the only one known to us where it extends also to the pores. The outer pore mouths, to the extent of a half inch, are often covered with a thick layer of laccate exudation.

While this is a most abundant species on Cabbage Palmetto in Florida, it was not named until recently, and then the deficiency was made up by giving it three names. We sent it to Ellis years ago, who referred it to Polyporus lucidus. Murrill named it Fomes zonatus, and at the same time Fomes sulcatus. Saccardo changed the latter to Fomes aratus, an unnecessary change, as the same species had been called also Fomes zonatus.

Compare aratus, sulcatus.

# ADDENDUM.

The following species were overlooked when the body of the pamphlet was written at Kew. We have in our collection a number of unnamed specimens, and I believe a number of unnamed species, but they will keep, and the subject will be more clearly presented by not being embarrassed with too many "new species." We would rather get the "old species" settled first. As additional specimens are received, and we get more light, it is probable that our views may change as to some of these collections, and we would prefer to change before, rather than after, publication. We have therefore in the body of the work only proposed a few new names where the differences were strongly marked.

The species of Europe and America stand out quite clear, owing to the abundance of collections that we have. Also, I believe those of the American tropics are mostly well known, due to the ample collection in the New York Botanical Garden, but from the remainder of the tropics, and from Japan and China, Australia, Africa and the East (excepting the Philippines) all classes of fungi, and particularly the Fomes, are but partially known.

We have received a liberal sending of Philippine specimens from E. D. Merrill, which affords a new species named in mss. and additional light on several of the old species.

**SECTION 59.** CONTEXT ISABELLINE.

FOMES FUSCO-PALLENS.—Pileus ungulate or applanate; with hard, dark, rough crust. Context hard. Pores minute, round, 2-3 cm. long, tissue isabelline near the mouths, but darker fuliginous above. Cystidia, none. Spores globose, 4-5 mic., hyaline (or seemingly very pale color).

This was received from the Philippines Nos. 3693 and 11352, named in mss. by Bresadola. It was not published in either of his Philippine lists. The tendency of the pore tissue to become darker is a feature of Fomes hornodermus, and the two species are related in other respects.

**SECTION 67.** BICOLORIS.

FOMES GRAFFII.—Pileus applanate, sessile, (3 cm. thick) with a hard, rugulose, brown crust. Context pale isabelline, yellow when moist, hard, ligneous. Pores dark brown, minute, 1½-2 cm. long, hard, with brown pore mouths. Spores globose, deep colored, 14 mic., smooth.

This is the third Fomes that has reached me belonging to the peculiar section with pale context and dark pores. All three of them in macroscopic characters are about the same, and to the eye alone would be held as the same. But the spores are very different as follows: Fomes sculpturatus, Madagascar—Spores elliptical, 14 x 20, pale colored, with sculptured surface. Fomes mirabilis—Straits Settlements—Spores small, globose, 7-8 mic., pale colored. Fomes Graffii, Philippines—Spores large, 14 mic., globose, deep colored. We have a feeling that it is a spore variation of same species, but we can not prove it and we would not assert it.

Fomes Graffii reached me labeled "Ganoderma bataanense" No. 19097, province of Bataan, collected by P. W. Graff. This was originally published as Amaurodermus, and, in my opinion, should have been so left. It was compiled in Saccardo as Ganodermus. I do not know Amaurodermus bataanensis excepting by description, which differs from this specimen in almost every point, and, besides, it is surely not a Fomes.

**SECTION 69.** CONTEXT BROWN, SPORES HYALINE. SETAE ABSENT.

FOMES YASUDAI (Fig. 606).—Pileus ungulate, (3-4 inches) with smooth, uneven, annular, sulcate, light brown crust. Context light sagal brown, scanty. Pores very minute, in annual layers 2-3 mm. thick. Pore tissue cinnamon, paler than the context. Pores subglobose, hyaline, 3½-4 mic. Setae none.

Based on a specimen (No. 8) from A. Yasuda, Sendai, Japan. Strongly marked by the narrow, annular, sulcate rings of the surface caused by the overlapping annual growths. There are a few narrow layers of context interposed between some of the pore layers, and as these are absent between most of the pore layers, it is due no doubt to seasonal conditions, and probably represent wet seasons. As to

texture and context color, the plant is very close to Fomes robustus of Europe (cfr. page 242), which never in Europe nor in other countries, as far as I have noted, has this peculiar annular, sulcate surface. The spores are much smaller than those of Fomes robustus, and the plant has no setae.

**Fig. 606.**
Fomes Yasudai.

FOMES ODORATUS.—Pileus ungulate, thick, hard. Surface dull, minutely villose, uneven by the overlapping growths. Context hazel brown. Pores small to medium, with thick walls, with the hymenium lining the pores lighter than the context. Setae none. Spores 4 x 8-10, cylindrical, hyaline. Odor when fresh strong, fragrant.

This is not a rare plant in Europe on spruce, but it does not occur in the United States. Our records are all in error. It is quite close to Fomes pini in shape, size and texture, in its context color, the contrast between the color of the pore lining and the context, and in a less degree in its odor, for Fomes pini is said to have a "weak odor" when fresh. The pores are smaller, the surface is different, but the most marked differences are the absence of setae on the hymenium, and the spores. When fresh the growing pores are bright

yellow, which one would hardly suspect from the dried specimen, for they become brownish with age. Though quite familiar with museum specimens, I did not recognize it at first and the only time I ever collected it. The distribution is peculiar, fairly frequent in Europe, absent from the United States, and it occurs in Japan. Fomes odoratus is generally known as Trametes odorata, and the reasons for the change are stated under Fomes "Trametes" below.

Illustrations.—There is no good colored plate. Schaeffer, t. 106, is supposed to represent it; but if so, very poor.

Specimens.—A number from Europe. None from the United States. One from Japan, J. Umemura.

NOTE.—Trametes odora is an unfortunate name in our literature, for it is liable to be confused with a real name, "Trametes" odorata. Trametes odora is supposed to be white, and similar to Trametes suaveolens, excepting in having minute pores. It is current in the traditions of England and W. G. S. measured its spores, but I doubt if any one ever saw a specimen. Patouillard also gives a drawing of it with white context and brown pores. It requires more faith than I have to believe that there is any such species.

**SECTION 70.** CONTEXT BROWN. SPORES HYALINE. SETAE PRESENT.

FOMES PUTEARIUS.—Pileus thin, conchate, with deep brown surface lighter on the margin. Often it is resupinate or with reflexed margin. Context color, light brown. Pores minute, concolorous. Setae slender. Spores hyaline, globose, 6-7.

**Fig 607.**
Wood rot caused by Fomes putearius.

This is very close to Fomes conchatus, so close that I was at first dubious as to its difference. It differs, however, in its host and it produces an entirely different "rot." The spores slightly larger, the spines fewer, and the surface with a slight resinous appearance. It is known only from our Western States on various species of acerous trees. It produces a characteristic rot (Fig. 607) full of pockets. It was named and figured in J. A. R. Vol. 2, 1914, by James R. Weir.

**SECTION 70.** FOMES "TRAMETES."

There are two perennial species which have been classed (in error) in Trametes that should be transferred to Fomes. These are the two species generally known as Trametes pini and Trametes odorata. We dislike to propose a name change for plants as well established and as generally known as Trametes pini, but as they are classed as Trametes from a mistaken idea of their characters, they should be corrected. Fries had the impression that they did not have stratified pores "sed nulla strata distincta," and for that reason put them in Trametes. This is a mistake. The pores are as distinctly stratified as any other Fomes (Fig. 608), and there is no reason why they should not be classed as Fomes.

FOMES PINI (Fig. 608).—Pileus ungulate, thick, hard, woody. Surface dark brown, rough, tomentose, with concentric raised zones. Context and pore tissue Sudan brown. Pores (Fig. 609) large, round, elongated or sometimes daedaloid, 1-3 mm. in diameter. Pore layers distinct in old specimens. Hymenium tawny, the pores lighter, more yellow than the context. Setae slender, sharp, large, projecting 30-40 mic. Spores globose, hyaline, 5-6 mic.

**Fig. 608.**
Fomes pini.

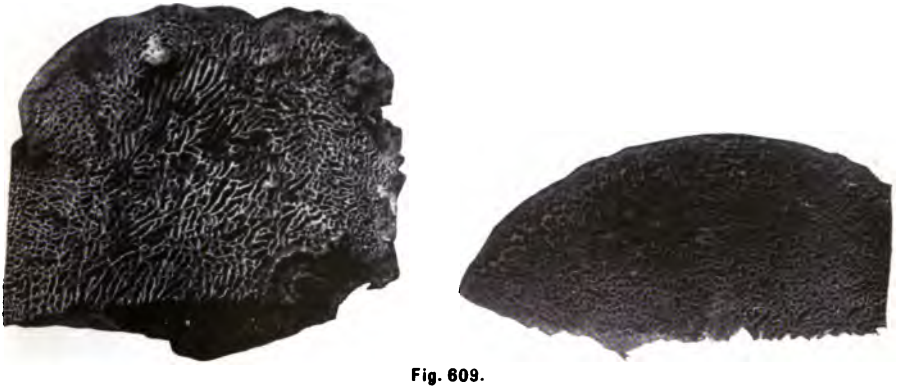

**Fig. 609.**
Pores of Fomes pini.

Hartig gives an excellent account of this well-known and destructive disease of pine trees. It occurs more common in Northern Europe and our Western States, though it is found no doubt in all pine regions. It is usually found on old trees and generally at some

height from the ground, for the tree is always infected originally through some wound, like a broken branch. I have never noticed it on trunks in woods, but have collected it on trunks in park at Upsala and around Berlin, where the trunks are more liable to injuries. It is not often found on young trees, because the wounds on young, vigorous trees are more quickly protected by a coating of turpentine. In Europe, in addition to the Scotch pine (Pinus sylvestris), which is its most common host, it occurs also on spruce, larch and the silver fir. In this country on various species of coniferous trees.

There is a tradition handed down from Fries that the pores do not form distinct strata "sed nulla strata distincta," but that is a mistake. The strata are quite distinct and the plant is a Fomes. The young pores are lined with a yellowish hymenium which is noticeable to the eye. The old pores fill up with tissue the same color as the context, hence might be taken for the context. The young growing tissue is yellow, but it soon changes to brown, and rarely specimens are seen with any part yellow.

Illustrations.—Boudier, t. 161 is so perfect that it is not worth while citing others. Sturm, fasc. 17. t. 50 is very good, however, as to color. Patouillard, page 101, fig. 5, as Xanthocrous, which is supposed to mean "yellow spores," and not very applicable to a plant like this (or several that he includes) with hyaline spores.

Specimens.—Many from Europe and United States and Canada. None from foreign countries.

Compare Fomes odoratus in Section 69, page 273.

The following two plants we consider here from their evident close relationship to Fomes pini. They are classed as Trametes, which they are technically, I believe, for I do not know that they ever form layers of pores. Still I think they are better Fomes, from their woody texture and relationship, but I do not propose to change their names.

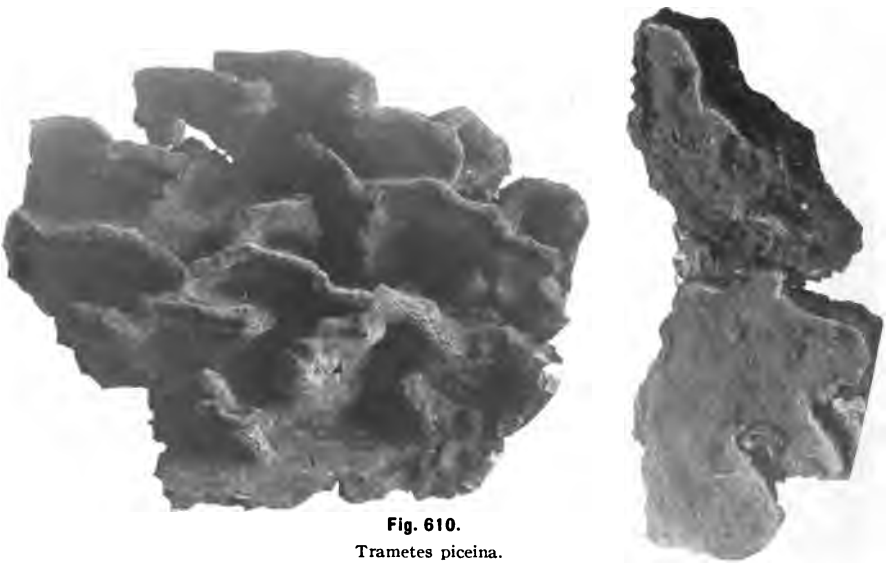

**Fig. 610.**
Trametes piceina.

TRAMETES ABIETIS.—Pilei thin, imbricate, often entirely resupinate or with a reflexed border. The large daedaloid pores (Fig. 609) and other characters are exactly as in Fomes pini, of which I consider it only a thin form. It occurs in northern Europe, and has been confused with Trametes piceina of the United States. Our figure (610) can be taken to represent it, excepting as to size of pores.

Specimens. Sweden, C. G. Lloyd.

TRAMETES PICEINA (Fig. 610).—Pileus thin, often imbricate, woody, 1-2 inches broad, often resupinate with reflexed margin. Surface tomentose, sulcate, zones, dark. Context Sudan brown. Pores small, 3-4 to a mm., round, regular, appearing hiascent and irregular when growing in an oblique position. Hymenium yellow when fresh, becoming brownish. Setae numerous, slender. Spores globose, 5-8 mic., hyaline.

This is a frequent species on the spruce in our Northern States. Von Schrenk records it on various coniferous trees (in addition to spruce) and states that it causes a common and destructive disease in our northern forests. He considers it same as Trametes Abietis of Europe as a variety of Fomes pini, but our American plant with its (usually) minute pores is well distinct and worthy of a separate name. We have two collections, however, that have larger pores which rather invalidate the argument. The plant was named by Peck as Polyporus, afterwards changed to Trametes, and was compiled in Saccardo as Polystictus (sic).

Specimens.—Many from H. D. House, State Botanist of New York, also several other collectors, all from Canada or our Northern States. Mr. House sends also some cotype material. We have eighteen collections, all with minute pores except two.

**SECTION 71.** CONTEXT BROWN. SPORES COLORED. SETAE PRESENT.

FOMES ENDOTHEIUS.—As this is exactly the same plant as Fomes rimosus, excepting smoother crust, I had supposed the type of endotheius at Kew was the same as Fomes rimosus, the surface not rimose, due to young condition of the specimens. Additional specimens, however, from the Philippines indicate that the surface does not become rimose, even when old. Hence Berkeley's species may be maintained on this feature. As to context color, pores, spores, etc., it is exactly the same as Fomes rimosus. It was discovered by Murrill to be a "new species," and called Fomes Merrillii.

FOMES FASTUOSUS.—Specimens recently received from the Philippines throw additional light on Fomes fastuosus (page 250) and Fomes pseudosenex (p. 255). They both have same context and spores. The former has but one layer of pores and context is lighter, but in the latter the darker context may be due to age. Fomes fastuosus may be a young condition of Fomes pseudosenex, but even should that prove true we would prefer taking Murrill's name, as Leveille had no definite idea in connection with his name and so-called three different species at Paris. We hardly think Murrill's idea was much more definite, but still he was not quite as bad as Leveille.

**ADDITIONAL SYNONYMS.**

Korthalsii, Java, Leveille. Type at Leiden is Polyporus sideroides (cfr. Letter 36). Leveille's naming at Paris, which is followed by Bresadola, is Fomes senex. Also most of specimens so named from Philippines.

## SYNONYMS, MISTAKES, SPECIES IMPERFECTLY KNOWN OR NOT KNOWN AT ALL, ETC.

acupunctatus, Ceylon, Berkeley. Type is resupinate, fragments said to consist of three species.

Aegerita, Mexico, Fries. No type exists. Described as white with white, floccose context. Description would indicate Fomes Laricis.

albogriseus, United States, Peck. Based on a young specimen of Fomes Laricis.

albo-limbatus, Africa, Cooke. No type found by me.

albo-marginatus, Java, Léveillé. = Fomes kermes. The "white margin" is "remarquable" for its absence not only from the type at Leiden, but from all the many collections in the museums. It was thus misnamed through pure incompetency, and the maintenance of such a misnomer is, in my opinion, without merit.

Alni, Asia, Sorokin. No specimen seen nor the figure. I presume it was Fomes roseus or Fomes pinicola. Either of them is probably a bad guess.

angulus, Japan, Lloyd. Pidgin latin for Fomes angularis.

anisopilus, Java, Léveillé. Never was a "Fomes," but a thin Polystictus. (Cfr. Letter 36.)

apiahynus, Brazil, Spegazzini. Unknown. From the description it is impossible to tell even to what it is related.

aratus, United States, Saccardo. Change of Ganodermus sulcatus, which would not have been necessary had it been compiled in Vol. 21 instead of Vol. 17. It is a synonym for Fomes zonatus.

Auberianus, Cuba, Montagne. = Fomes lignosus. In the sense of early American mycology as determined in Europe for Langlois = Fomes geotropus.

aulaxinus, Java, Bresadola. There is a cotype at Kew. I cannot note how it can be distinguished from Fomes McGregorii.

balabacensis, Philippines, Murrill, = Polyporus pediformis.

bambusinus, China, Patouillard. This, as described, is a Polyporus rather than a Fomes, as compiled in Saccardo. It resembles closely Polyporus licnoides as to pores, color, setae, and spores. It bears colored, conidial spores of a different type from its basidial spores. I would consider it a species of Polyporus, closely related to Polyporus gilvus.

bistratosus, Brazil, Berkeley. Type a "resupinate" piece, a Poria.

Bonianus, China, Patouillard. Bresadola has referred this to Fomes pectinatus. I think the type in Patouillard's herbarium is not Fomes pectinatus, but Polyporus capucinus.

Brownii, Europe, Humboldt, = Fomes rufo-flavus, teste Bresadola.

brunneo-griseus, South America, Patouillard. Not seen by me. Flesh brown. "Spores hyaline, 5 x 6." Seems to belong to the fomentarius group.

Cajanderi, Siberia, Karsten. Unknown. Nothing can be inferred from the description.

caliginosus, Borneo, Cesati. The cotype at Kew is the same as caliginosus of Berkeley. Henning renamed Cesati's species (or rather Cesati's name) Fomes Cesatianus, which was hardly necessary.

canaliculatus, Java, Patouillard. Unknown to me. Compared by author to Fomes rufo-flavus.

castaneus, Europe, Fries. Unknown, name change of populneus of Pollini. The figure Pollini cited I have not located, but the description seems to be Fomes annosus.

Cedrelae, Jamaica, Murrill, = Fomes rimosus.

cereus, Brazil, Rick (No. 108 attributed to Berkeley). There is some error, as no such species was published by Berkeley. I would class it as a Trametes, and have labeled the specimen Trametes farcta. Its relations are with Polyporus gilvus.

Cesatianus, Borneo, Hennings. Change of caliginosus of Cesati, which being the same as caliginosus of Berkeley and having several other names, was hardly worth renaming.

chilensis, South America, Fries. The type at Upsala, all that is known to me, is a thin, subresupinate Ganodermus, about the same as usually called australis.

circumstans, Western United States, Morgan, = Fomes Ellisianus, as Morgan admitted, and for me = Fomes fraxinophilus. Morgan complained to me that Ellis published Fomes Ellisianus in a journal where a mycologist would not be apt to see it.

compressus, Australia, Berkeley, = effete Polyporus ochroleucus.

concentricus, Japan (alleged), Cooke. Known only from the type locality, and that locality not known. There is one collection with nothing to indicate the source except from Hooker's collection. It was published as coming from Japan, but as far as I have ever noted there were no specimens in Hooker's collection from Japan, and no indication that this was. It is close to Fomes leucophaeus, but with a variegated crust, the same pores, spores, and pore mouths. The context color, however, is much lighter (buckthorn brown).

contrarius, Brazil, Cooke. Type poor, appears to me to be probably subresupinate Fomes annosus.

Copelandi, Philippines, Murrill, = Fomes caliginosus. Cotype specimen at Paris.

Cornu-bovis, India, Cooke, = Fomes melanoporus.

crassus, Europe, Fries. Seen by Fries in the herbarium of Beyrich and supposed by Fries to be a lapsus. It is hardly worth obscuring the subject with such "species."

cremorinus, Borneo, Cesati. No specimen found by me, and the description (with "fulvescent" context) suggests nothing to me.

crocitinctus, Cuba, Berkeley. The types at Kew are all that are known, and are not surely Fomes. More probably Polyporus. Surface is dark, glabrous, wrinkled. Context scanty and pores bright yellow or rhei color. Hyphae deep yellow, spores small, 2½-3, globose, pale colored. Setae, none. It is not very ligneous and has no strata of pores. If a Fomes, it is close to Fomes pectinatus in Section 71. It is about the same size and shape as pectinatus.

crustosus, Jamaica, Murrill, = Fomes inflexibilis, teste author, but I believe not.

cryptarum, Europe, Bulliard. Buillard gave an excellent figure of a very poor specimen which had wasted a lot of energy trying to take a normal form under abnormal conditions. From its coloration, Bulliard's plant was probably Fomes annosus, but Fomes cryptarum is quite a convenient name for anything that, growing in abnormal conditions, takes this abortive form, and has been applied to several abortions by Fries, Berkeley, Rabenhorst, and others.

Curreyi, Perak, Cooke, = Trametes strigata.

cytisinus, Europe, Berkeley. This is the same plant as is called Fomes fraxineus in current usage. Fomes cytisinus is the correct name for it. No type is preserved, but from Berkeley's writings, there can be no question. The specimen in Cooke's herbarium (vide Berkeley) is not the plant.

deformis, Europe, Schaeffer. Based on an old figure (Schaeffer 264), and nothing in Europe is known to correspond. The only plant that I can suggest that is at all like the figure is Polyporus corrugis (cfr. Stip. Pol., p. 122).

Demidoffi, Russia, Léveillé. Same plant as Fomes juniperinus. Instead of making "laws" to induce men to use such uncouth names as Demidoffi when the plant has a good and appropriate name, there ought to be some adequate punishment for those who inflict such names upon defenseless plants.

diffusus, Hawaii, Fries, = Fomes lignosus, a thin annual form. Type at Upsala.

Earlei, Southwest United States, Murrill, = Fomes juniperinus, absolutely the same in every particular.

elatus, West Indies, Léveillé. No type exists.

Ellisianus, Western United States, Anderson (as alleged, but Ellis in fact without doubt, as Anderson never worked on the subject except as an artist). Generally held to be valid, a species growing on the Shepherdia in the West, but for me is the same plant as Fomes fraxinophilus on the ash in our Eastern States.

Elmeri, Philippine, Murrill, = Fomes pachyphloeus.

endapalus, Australia, Berkeley. This has been published as the same as Fomes caliginosus. It is known from one collection only, which may be young caliginosus, but appears different to me, softer, subresupinate, with different habit of growth. Fomes caliginosus grows in abundance in the Philippines and other Eastern islands and countries, but there are no typical species from Australia at Kew. Endapalus seems to be pidgin Latin or typographical error for endopalus, as the specimen was labeled by Berkeley.

endophaeus, India, Berkeley. No type exists, but from description most probably it was Fomes melanoporus.

Engelii, Europe, Harz = Fomes rufo-flavus. Specimen at Berlin.

enteroleucus, Chili, Fries. No type exists. In a general way the description suggests a Ganodermus, but the "white" context forbids.

epimiltinus, Ceylon, Berkeley. Known from type only at Kew. A resupinate piece, a Poria.

Evonymi, Europe, Kalchbrenner, = Fomes ribis. However, it is usually of a brighter color than the form on Ribis.

excavatus, British America, Berkeley, as a variety of Fomes fomentarius. It is the type form on birch. See our figure (584), made from this "type."

expansus, Europe, Desmazières. Two quite different species are found in Desm. exsiccatae under this name. One of them seems to me a resupinate form of Fomes fomentarius, that is, the same pores, but I do not know that Fomes fomentarius is ever resupinate. Fries so lists it. It was an abnormal growth in a cellar or mine. In Desmazières' herbarium at Paris most of the specimens under this name are a Poria, resembling Poria ferruginosa as to color, but having no setae.

fasciatus, Jamaica, Swartz. I have seen no type. At the British museum is a very old specimen, collected in Jamaica by "Mr. Poore," which I had supposed was the type of Swartz, but on noting it again carefully, I see there is nothing to connect it with Swartz. In the sense of this specimen the plant is the same as Fomes marmoratus, and I have heretofore so used the name. I am told by Mr. Romell that there exists in Sweden a type from Swartz which is not Fomes marmoratus, hence I must adopt Berkeley's name as fasciatus originally was not this plant.

flaviporus, Europe, Quélet. This is the mss. name under which Quélet sent Fomes laccatus to Fries. It is still so preserved at Upsala. Quélet evidently published it as Fomes resinosus.

focalis, Africa, Kalchbrenner. No type found in any museum.

fuliginosus, Europe, Scopoli. The old description of Scopoli is a guess at best. By Quélet and others used as a juggle for Polyporus benzoinus, which appears to be a good guess, but is illegal now, and in any event never was a Fomes.

Fullageri, Australia, Berkeley. No type exists.

fulvus, Europe, Schaeffer. The old figure appears to me to be a crude cut of Fomes roseus. His remarks do not apply at all. It is also alleged to be Fomes pinicola. No one knows what it is.

furcatus, Java, Junghuhn. No type found by me at Leiden (cfr. Letter 37). Junghuhn cites a figure, but never published it.

fusco-purpureus, Europe, Boudier, = Fomes torulosus.

gelsicolor, Europe, Berlese. No specimen known to me, but from figures, description, and spores, it is based on a half-ungulate specimen of Fomes applanatus.

gelsorum, Europe, Fries. Known to this day only from the crude cut of Battarrea of over 150 years ago, and based on an assertion in the start.

Gillotii, Europe, Roumeguere (as Polyporus), = Fomes annosus, vide cotypes at Berlin.

glabrescens, Mauritius, Berkeley. This I would refer to Fomes geotropus. It differs slightly in having a smoother surface, but is too close to maintain as distinct.

glaucotus, Japan, Cooke, =adamantinus. The type at Kew is the only Japanese collection known.

Gourliei, Australia, Berkeley. Only known from the "type locality." A little remnant that should never have been named. Surely not a Fomes in any event. Endorsed now as a form of Polystictus occidentalis.

grenadensis, West Indies, Murrill. This is based on one collection from Grenada, and appears to be exceptional in having the narrow pore layers separated by very narrow but distinct context layers. Context cinnamon brown. Pores minute, the narrow unusual layers strongly distinct on account of the interposed context. The

pores are completely filled with white hyphae, but I doubt if that is a normal feature of the plant. Setae, none. Spores globose, colored, 5 mic. While the interposed layers of context are unusual among Fomes, species based on this feature in Europe (Fomes vegetus) are known to be abnormal conditions, and that may be the case in this instance. On the other hand, Fomes connatus is always so characterized.

griphaeformis, Australia, Berkeley. No type exists.

Haematoxyli, Jamaica, Murrill. Based on one collection which, except as to shape (more applanate), is quite close to Fomes igniarius and probably a form. The context is dark brown. The "honey-yellow-context" of the description was a careless observation of some yellow, mycelial growth that had overrun the surface of some of the old tissue.

halconensis, Philippines, Bresadola (as variety of spadiceus). Unknown to me. It seems quite large to be referred as a variety of spadiceus.

Hasskarlii, Java, Léveillé. The type cited at Leiden is the same as senex of this pamphlet. Cotype at Kew is Fomes pectinatus. Owing to the confusion, we prefer to use Montagne's previous name, Fomes senex, although that was also badly confused by Montagne. We have heretofore used the name Hasskarlii (cfr. Letter 38).

helveolus, Europe, Rostkovius. The figure seems to be Fomes pinicola, but the description does not at all accord. Fries so referred a plant collected by Lindblad, which Romell thinks must have been Fomes pinicola. Rostkovius described helveolus as being "fleshy," but no similar fleshy plant is now known in Europe.

hippopus, Incog, Bresadola, = Fomes hornodermus. This is based on an old specimen in Willdenow's herbarium, labeled "Boletus Hippopus," but not published until 1890. Spores teste author 5 x 8-9. In Saccardo (9. 174) it is in error ascribed to Europe. It corresponds to the common plant in Africa, which was probably its source. The African form has a smoother, more even surface than the American, and might be maintained as a form.

Höhnelii, Java, Bresadola. Unknown to me. Compared to Fomes zelandicus, with setae and colored spores, 5 x 6.

holomelanus, Brazil, Cooke, = Fomes atro-umbrinus. Berkeley labeled two lots, one atro-umbrinus (which he published), the other holomelanus, which Cooke dug up and published. They are exactly the same thing, same collector, and probably same collection. v. Höhnel has an interesting notation on the type of holomelanus that it is a Ganodermus (sic).

hyperboreus, Canada, Berkeley. No type exists. Guessed by Murrill to have been possibly Fomes igniarius, which appears to have been a bad guess if its context was "pale cervine," as described.

hypopolius, Australia, Kalchbrenner (as Polyporus). No specimen in museum, but description indicates Fomes annosus.

ignarioides, Mexico, Patouillard, = for me young Fomes rimosus, same context color, spores and absence of setae. The surface is not rimose, but the specimen is young. If this is not Fomes rimosus it is surely Fomes endotheius, which is too close to Fomes rimosus. The context color (whence the name) is not that of Fomes igniarius, but Fomes robustus, the latter being misknown as Fomes igniarius locally in France.

inaequalis, Finland, Karsten (as Trametes). Specimen at Upsala appears to me to be young nodules of Fomes igniarius (malvenu).

incanus, Europe, Quélet. Quélet claims that Fomes ulmarius, fraxineus, and cytisinus were all the same species for which he invented a new name, Fomes incanus. If it were true, which it is not, there would be no occasion for a new name.

incrassatus, Australia, Berkeley, = Fomes leucophaeus.

introstuppeus, Perak, Cooke, = Fomes fomentarius.

Inzengae, Italy, De Notaris. This is the common Fomes fomentarius. Several exsiccatae specimens are found in the museums.

irregularis, United States, Underwood (as Polyporus), = Teste Murrill, subresupinate Fomes annosus. I never took the trouble to look it up. If Underwood did not know the common Fomes annosus, he was particularly competent to announce "new species."

Kamphöveneri, Tahiti, Fries, = Fomes lignosus. Type at Upsala. At one time this was the name used by Bresadola, though he has since accepted my cor-

rection and now calls it Fomes lignosus. Fries sent a specimen to Berkeley as Kamphöveneri, which is not the same as the type in his own collection, but is Fomes semitostus (or close).

Korthalsii, Java, Léveillé. See page 277.

laeticolor, Philippines, Berkeley, = Fomes Kermes.

laminatus, Central America, Ellis. This is the name written on the label which was afterwards described as Fomes rubritinctus, with no reference to the original name. Smith distributed it under the name laminatus.

Langloisii, United States, Murrill. The cotype specimens I have are old with an indurated surface, and do not show the brown tomentum, but are otherwise old Fomes ribis in every character. The spores are small, 3 mic., colored (not hyaline as described). Langlois found this on Crataegus years ago and sent it to several mycologists. One referred it to Fomes pectinatus, another to Fomes senex, another to Fomes conchatus. Mr. Murrill probably thought it could not be all three of these at the same time, so he called it a "new species."

Leaianus, United States, Berkeley. Mss. afterwards named Fomes ohiensis (as Trametes). Berkeley sent specimens to Montagne under this mss. name.

leprosus, Brazil, Fries. No type exists.

Le Rati, New Caledonia, Patouillard, = Fomes semitostus.

levissimus, Ceylon, Fries. My notes concerning the type are "very poor, not recognizable, not a Fomes, however." I have since gotten Fomes floccosus from Ceylon, and from description of levissimus, I believe it is probably same.

ligneus, West Indies, Berkeley. In my opinion, same as Fomes hornodermus. The old type is discolored, but hornodermus is known from many recent collections from the West Indies, and is the only Fomes that seems to occur there, to which ligneus may be referred. Still there is an element of doubt, and for that reason we use the more recent and more certain name.

Lilliputiana, Brazil, Spegazzini, (as Trametes)= Fomes pectinatus, teste Bresadola. Unknown to me. No specimen found by me in any museum.

Lipsiensis, Europe, Batsch. Fig. 130 is a crude cartoon cited by Persoon and Fries as doubtfully representing Fomes applanatus, and dug up and used as a cheap juggle for Fomes applanatus by Murrill and later by Atkinson. The latter writer, after indulging in such work himself, was inconsistent enough to go to Brussels and vote six or eight times for a law outlawing others who engage in similar work.

lividus, Australia, Kalchbrenner. A species of Poria, types at Kew and Berlin.

lobatus, United States, Schweinitz. This was an abortion and a distortion, and the "species" was based on this fact. Had it been normal, the author would probably have referred it to "Fomes fomentarius" (sic). It is claimed (which is a guess at best) that it is the same that Morgan called Polyporus reniformis, and the name has been used as a juggle in this sense.

Lonicerae, Europe, Weinmann, = Fomes Ribis.

loricatus, Europe, Persoon, = Fomes salicinus (cfr. Myc. Notes, page 469).

luzonensis, Philippines, Murrill, = Trametes plebia.

malvenus, Samoa, Lloyd, see tropicalis.

marginatus, Europe, Persoon. The name was applied to the frondose form of Fomes pinicola when that was supposed to be different from the form on pine wood. As used by modern authors in exsiccatae, it is usually a synonym for Fomes pinicola. Fuckel, however, distributed Fomes annosus under this name.

medullaris, India, Berkeley. No type exists. Probably it was a Ganodermus, as it was described as laccate, but that is as much as one can ever guess concerning its identity.

megaloma, United States, Léveillé. No type exists, and it is unknown. It was used by Murrill as a juggle for Fomes leucophaeus, apparently a vague guess, because Léveillé states "that it was similar but different from Fomes applanatus." Léveillé, however, left American specimens which are typical Fomes leucophaeus and labeled them Fomes applanatus, so I do not see how Fomes leucophaeus can logically be held to be the same as Fomes megaloma, when all that is known about the latter is Léveillé's vague statement that it differs from applanatus, and there is positive evidence that Léveillé thought that leucophaeus was the same as applanatus. There is also some additional evidence at Paris on the subject. Léveillé left a specimen which Mr. Murrill claims should be called "Fomes megaloma, Lev." which Léveillé labeled Fomes fomentarius (sic). Therefore, according to Mr. Murrill, Léveillé

discovered a "new species" which he named Fomes megaloma, but did not leave any evidence excepting Mr. Murrill's imagination as to its identity. The evidence Léveillé left was in the specimens labeled Fomes applanatus and Fomes fomentarius (sic). The whole history is a fine example of the kind of work done by Léveillé and the evidence on which Mr. Murrill published his opinions of such work.

melanoporoides, East Indies, Cesati. No specimens found by me in any museum, and it is said that no type exists. Undoubtedly, however, it was Fomes melanoporus. Specimens so determined at Kew are Polyporus durus.

Meliae, United States, Underwood. Types are old and discolored, but I believe old specimens of Fomes connatus. Recently determined specimens as Meliae I am sure are connatus.

Memorandus, South America, Spegazzini. Unknown, no specimen in the museums. Description reads much like albo-ater.

Merrillii, Philippines, Murrill, = Fomes endotheius.

microporus, Jamaica, Swartz, = Fomes lignosus, and is the earliest name for it. The type at British Museum is scanty and small, and for a long while I was in doubt whether it was Polyporus zonalis or Fomes lignosus. Only recently I have been able to satisfy myself.

mirus, Siberia, Kalchbrenner. The type material I have noted is only a little bundle of pores, but is the common Fomes fomentarius. Is it any wonder that Kalchbrenner made so many startling discoveries in "science," if he thought the common Fomes fomentarius was "marvellous?"

mortuosus, Pacific Islands, Fries, = Fomes caliginosus teste Bresadola.

Neesii, Europe, Fries. Unknown either from specimen or figure. Fries collected it on beech, and why he named it Neesii I do not know. The original description, "hardly a line thick," would indicate a Polystictus rather than a Fomes.

nicaraguensis, Central America. Berkeley. No type exists.

nigricans, Java, Junghuhn, = Fomes australis testes Fries.

Novae-Angliae, United States, Berkeley. The type, a single specimen, is a thin, brown Polyporus, closely related to Polyporus rutilans. I do not recognize it as any species I know. The surface is brown, pubescent, context brown, and pores brown. Setae, none. Hyphae pale colored. Spores no doubt white. It is not a Fomes, nor has it the most remote suggestion even of being Fomes igniarius, which Murrill vaguely guesses it to be.

noveboracensis, United States, Saccardo. Given in Saccardo, Vol. 6, p. 192, as a variety of scutellatus. Author not stated, as Saccardo seems to have followed my plan of omitting advertisements. No such "variety" of scutellatus is known in America.

nubilus, Africa, Fries. No type exists, but teste Fries it was the same as ferreus of this pamphlet. In the sense of Patouillard, it is Trametes cingulata.

ochrocroceus, Java, Hennings, = Fomes kermes.

odora, Europe, Fries. See page 274.

officinalis, Europe, Fries. This is Fries' name for Fomes Laricis, and is "legal" now. The plant was known to the oldest authors and medical works as "fungus laricis," etc. Rubel, in Jacquin Misc., Austria, 1778, had an article on the drug, which he called Agaricum officinalis, and the plant was crudely figured (t. 20, 21) and named (page 172) as Boletus Laricis. Gmelin changed it to Boletus purgans, which was followed by Persoon. Fries, of course, could not follow Persoon, so he dug up an old name of Villars, Boletus officinalis, based on the Latin name for the drug instead of the name for the species.

oleicola, Africa, Hennings. Type not found by me at Berlin.

orbiformis, Africa, Fries. The type at Upsala is a subresupinate Ganodermus. It is said to be the same plant that I call mastoporus. I hold the type to be inadequate to decide.

oxyporus, Europe, Sauter. No specimen known to me. It is said to be Fomes connatus.

pachydermus, Philippines, Bresadola, = adamantinus, and so corrected by the author.

Palliser, British America, (Berkeley Mss.) Cooke. This was also named by Berkeley in mss. Trametes arctica, and we adopt the mss. name instead of the published name, as neither the publication, description, or specimen that Cooke published as "Polyporus Palliser Berk." had any reference or resemblance to plant

so named by Berkeley (in mss.), nor does it grow in the same hemisphere (cfr. Note 8, Letter 32). It is a variety, but a marked variety of Trametes carnea, as I published years ago. The name Trametes Palliser has since been taken for Trametes carnea, but I believe without merit, as it refers only to the variety, and should not be substituted for the "type" form, and also it has never been "described", for the "description" published referred to an entirely different plant.

Pandani, China, Fries. Loureiro one hundred and twenty years ago vaguely ascribed to "Boletus igniarius" a collection from China which he described as thin and red. As it was evidently misnamed, Fries named it Polyporus Pandani. Cooke decided it was a Fomes (sic). If it had been called Polystictus sanguineus, it would have been probably nearer the truth.

Pappianus, Africa, Bresadola, = Fomes badius. I learned the plant under this name, and would be disposed to continue it, but feel it is unfortunate that a man should be so named, and hesitate in inflicting it on a plant.

paradoxus, Europe, Humboldt, = Fomes rufo-flavus, it is stated. The crude figure Humboldt gives represents nothing.

peguanus, India, Montagne. There is no type at Paris, but I found one at Berlin. How it got there I am unable to say. It is the same as Fomes caliginosus.

perpusillus, Incog. Persoon. The originals are in the herbarium of Persoon so labeled. There is no locality on the label. It was published by Léveillé as "Hab. America borealis ad truncos," which I think is wrong, as I do not recognize it as any American species. It is said to be Fomes scutellatus, but of this I am not so sure.

Pfeifferi, Europe, Bresadola, = Fomes laccatus.

phaeus, India, Berkeley, = Fomes melanoporus.

philippinensis, Philippines, Murrill. Described with isabelline context, smooth, pale crust. Spores hyaline, 4 x 5. No specimen seems to have been distributed to any museum in Europe.

piceus, Borneo, Cesati. No type known by me, but probably the same as Fomes pseudoaustralis or Fomes subtornatus.

ponderosus, Australia, Kalchbrenner. No specimen found by me in any museum, but from description appears to be Polyporus durus, and is probably not a Fomes.

ponderosus, United States, Schrenk, = Fomes pinicola teste Murrill.

populinus, Europe, Schumacher. A vague, old reference, used first by Karsten and afterwards by others as a juggle for Fomes connatus. The figure Flo. Dan. 1791, which is a specimen "legit Schumacher," appears to be a Polyporus (not a Fomes), nor does it have the coloration of Fomes connatus.

praerimosus, United States, Murrill, = Fomes Everhartii, as the author admits.

propinquus, South America, Spegazzini, unknown.

pseudoconchatus, Africa, Hennings. The type is in the show department of the museum at Berlin. It is an unusually large specimen (3-4 inches in diameter) of Polyporus fruticum.

punctatus, Java, Junghuhn. No type found.

purgans, Europe, Gmelin, = name change of Laricis. It was adopted by Persoon.

pyrrhocreas, Australia, Cooke, = Fomes Kermes.

resinosus, Europe, Schrader. A vague, old description, probably originally same as Fomes laccatus of this pamphlet. In sense of Quélét, it is Fomes laccatus. In the sense of Fries' Hym. Europe, it is Polyporus fuscus, very common in the United States, and close to Polyporus benzoinus. It was evidently misnamed by Fries, for it is not "resinous," and the original calls for a strongly resinous plant. It is legal now, however, for it is against the "law" to correct Fries' mistakes.

Robiniae, United States, Murrill, = Fomes rimosus.

roseo-albus, Java, Junghuhn. A subresupinate, Polyporus or perhaps Fomes. The type at Leiden is unsatisfactory, and the name has no application to it, now at least, for there is nothing about it either "rosy" or "white." Bresadola takes it in the sense of Fomes caliginosus of this pamphlet, in which case the name has even less application.

rubiginosus, Europe, Schrader. An old, vague description, variously interpreted. Given by Fries as a synonym for Polyporus resinosus in his sense (fuscus for me), which is also only an interpretation of an old, vague description, and was probably as wrong as the synonym. At one time Bresadola used rubiginosus as a

substitute for Fomes applanatus, but has since abandoned it. At Kew there is a "type" specimen of rubiginosus from Fries which is Polyporus cuticularis.

rubriporus, Europe, Quélet, = Fomes torulosus.

rudis, Africa, Patouillard, = Fomes Yucatensis, and both could be considered as being Fomes rimosus with setae.

rudis, West Indies, Léveillé, = Polyporus supinus (?). The type is quite old, and the characteristic context color of Polyporus supinus is not sure. Also it is thinner. Murrill refers it as a pale form of Trametes Persoonii, which was a very bad guess, as it has no relation whatever to it. Patouillard published it as a Ganodermus, also an evident error.

rufo-pallidus, Europe, Trog. = Fomes roseus, young specimen. Fries' Icones under this name is a good drawing of young Fomes roseus. There is a type from Trog at Paris.

Sancti Georgii, South America, Patouillard. This has the same surface, context, pores, pore mouths, and spores as Fomes Niaouli, and is too close to keep distinct. The context is of a shade darker color, which is all the difference I can note. I believe it is a "prior" name.

scansilis, Pacific Island, Berkeley. Based on a diseased condition of Fomes australis when the context has turned white. These conditions are not rare even in European and American forms of Fomes applanatus. I do not know what causes it, but judge it is a disease of some kind.

sclerodermeus, West Indies, Léveillé, = Fomes marmoratus, and is perhaps an earlier name for it. I have not looked up the dates.

sclerodes, Cuba, Berkeley. No type exists.

Secretani, Europe, Orth (as Trametes). Specimen so labeled "Orth in herb." at Paris is Fomes connatus.

sordidus, "America," Léveillé. No type found by me. The only specimen at Paris is from Guadaloupe, and is probably Valenzuelianus. It is endorsed by Léveillé "differs by its pale context," hence it is probably not the type.

squalidus, Brazil, Fries. No type exists.

Stevenii, Russia, Léveillé. Specimen is not preserved in any museum I have visited. I have been told that it is in Italy. From the figure and description, I judge it is Fomes leucophaeus.

subextensus, Philippines, Murrill, = Fomes senex.

subferreus, West Indies, Murrill, = Fomes dochmius as to the type, also specimen recently distributed (Wien 1908).

subfomentarius, Brazil, Romell, = Fomes marmoratus, as the author acknowledges on a label at Kew.

subfulvus, West Indies, Cooke. Change of Polyporus rudis (q. v.) of Léveillé, which is so indefinite that one name is enough for it. Cooke never saw it, and "subfulvus" would have no application to it. The type is old and very doubtful. Probably it is Polyporus supinus.

sublinteus, Mexico, Murrill. Not a Fomes, but a Polyporus with colored spores. Based on little pieces in Ellis' herbarium. One piece seems to have had a stem.

subpectinatus, West Indies, Murrill, = Fomes pectinatus, regular specimens. Spores 3½ rather than 2 mic., as described. Rick distributed this plant as Fomes capucinus.

sulcatus, South America, Cooke, = Fomes hornodermus. The pores are slightly larger and the context not so hard, but I think it is the same species.

sulcatus, United States, Murrill. Same species as called by same author Fomes zonatus. The name sulcatus is a duplicate (in Fomes), having been used by Cooke.

Swietiniae, West Indies, Murrill. Represented at New York by two specimens of quite different context color, and not the same species in my opinion.

tasmanicus, Tasmania, Berkeley. Type very poor. In my opinion, Fomes semitostus.

tenax, South America, Léveillé. No type exists.

tenuis, Europe, Karsten. Usually a Poria, though I once collected a Fomes form. Very common in Sweden, and surely known to Fries, who called it, I think, Poria ferruginosa. For me, it is Poria ferrea.

testaceus, Brazil, Léveillé. Type at Paris a little deformed specimen of Fomes australis. Used in this pamphlet in the sense of Patouillard, not Léveillé.

thelephoroides, Europe, Karsten. Unknown. Said to have the "form and color of Thelephora laciniata." That must be a curious "Fomes." It is a pity that Karsten did not distribute such a remarkable find. See his figure, which appears to be something unusual, but a doubtful "Fomes."

Thomsoni, India, Berkeley. Known only from the type, an old and very poor specimen with large pores. Not a Fomes, but a Trametes, and as a guess, Trametes Persoonii.

tornatus, Rawak, Persoon. The original specimen at Paris was endorsed by Léveillé as being Fomes australis. It was a case where Fries had ignored "priority" because it was Persoon's name, not his own, at issue. Our modern lawmakers have legalized this method of robbing poor old Persoon, for he had no standing at Brussels. Murrill is the only knight errant of modern times who battles for the rights of poor old Persoon. He used it as a juggle for Fomes australis.

tostus, Philippines, Berkeley, = Trametes Persoonii.

tropicalis, South America, Cooke. This rests on one quite abundant, but, I think, abnormal, collection. It is of the same nature as Fomes cryptarum. The context hard, isabelline, pore mouths pale, probably white when fresh. The abortive pileus surface black, smooth. I made a very similar collection in Samoa, but evidently a different species, which I have labeled Fomes malvenus, merely to have a name for it in my collection, but I do not place much stress on these evidently abnormal things.

Troyanus, Jamaica, Murrill. Types are two little undeveloped specimens, in my opinion inadequate material on which to base a species.

tuniseus, Tunis, Patouillard. Based on one collection on the locust tree, from Tunis, and for me = Fomes rimosus.

Underwoodii, West Indies, Murrill, = Fomes badius.

ungulatus, Europe, Schaeffer. This is one of several names under which Schaeffer illustrated Fomes pinicola. As found in Saccardo, it is a definite idea of the ungulate form with narrow annual layers. As usually used by modern authors in exsiccatae, it is only a juggle for Fomes pinicola.

variegatus, Europe, Sowerby (not Secretan, as innocently cited). From Sowerby's remarks, rather than from his figure, which is too yellow, I judge this is the sessile, annual Polyporus recently named Ganodermus resinaceus in Europe.

vegetus, Europe, Fries. This is a condition of Fomes applanatus with layers of context interposed between the pores. It is not rare in Europe.

verruculosus, South America, Meyer. No specimen preserved probably, but from description, it was surely Fomes pectinatus, and a "prior" name.

versatilis, Europe, Quélet, = Fomes Ribis, teste Bresadola. Quélet in his last work calls it Fomes pectinatus.

versicolor, Australia, Hennings. Type not found by me at Berlin. Said to have colored spores. Setae not mentioned.

Williamsianus, Philippines, Murrill. Unknown to me. Not distributed to any museum in Europe. From description, it is a Ganodermus with asperate spores in Section 78.

Williamsii, Philippines, Murrill, = Fomes lamaensis, and named on the same page. The next year Murrill withdrew the species and referred it to Fomes endotheius, to which it has little resemblance, and no analogy.

Xylocreon, South America, Spegazzini, unknown.